DOMINICA.

ANNUAL REPORT

OF THE

Department of Agriculture

AND

Forestry

FOR THE YEAR

1951

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DEPARTMENT OF AGRICULTURE AND FORESTRY — DOMINICA

AGRICULTURE AND FORESTRY STAFF
(as at 31st December, 1951)

Superintendent of Agriculture and Chief Forest Officer	St. G. C. Cooper, A.I.C.T.A., Dip. Agric. (I.C.T.A.)
Assistant Superintendent	Vacant
Livestock Officer	P. H. Prince
Agricultural Assistant, Northern District	S. O. Pringle
Agricultural Assistant, Middle District	Vacant
Agricultural Assistant, Windward District	Vacant
Senior Agricultural Instructor	G. J. Stedman (Seconded)
Cacao Assistant	H. C. Burton
Agricultural Instructor — Grade I.	A. C. Winston
„ „ „ I.	R. P. Lander
„ „ „ II.	C. A. Winston
„ „ „ II.	E. S. Lancaster
„ „ „ II.	J. A. John
„ „ „ II.	F. P. Carbon
„ „ „ II.	J. B. Colaire
„ „ „ II.	E. O. Le Blanc
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„ „ „ III.	S. F. Rodney
„ „ „ III.	R. J. Cuffy
„ „ „ III.	E. Jones
„ „ „ III.	A. Guye
Foreman, Botanic Gardens	W. G. Coipel
Foreman, Cacao Station	A. Defce
Overseer, Lime Station	G. Casimir
Manager, Goodwill Estate	C. C. Bellot

FORESTRY

Assistant Conservator of Forests	J. A. N. Burra, B.Sc., (For) Edin.
Forest Supervisor & Surveyor	C. O. Hill
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ANNUAL REPORT

OF THE

DEPARTMENT OF AGRICULTURE AND FORESTRY

DOMINICA

1951

INTRODUCTION

The year 1951 witnessed several changes in the administrative personnel of the Department. Mr. L. L. de Verteuil, Agricultural Superintendent from 1943 — 1951, was transferred to Trinidad as Cacao Agronomist in July, and Mr. L. Kong acted until August when he accepted a transfer to British Guiana. Mr. E. Martin, Assistant Agricultural Superintendent of Antigua, was in temporary charge of the Department from August until the arrival of the writer in mid-September, 1951. Mr. Martin returned to Antigua two days after my arrival. Such frequent and rapid changes could not be expected to make for continuity of policy, but although administratively a difficult year, it was fairly satisfactory agriculturally.

2. The post of Assistant Agricultural Superintendent remained unfilled from August to December, 1951, as well as two vacancies in the Senior post of Agricultural Assistants since 1947.

3. Dr. F. J. Simmonds of the Commonwealth Bureau of Biological Control paid a visit to the Colony during the year. This visit was sponsored by the Caribbean Commission. Extracts of his report on the incidence of insect pests in Dominica are published as an Appendix to this report, and it is hoped to implement the recommendations made.

4. Another visit of importance to the Colony was paid by Mr. D. B. Murray, Plant Physiologist, I.C.T.A., with the kind permission of the Imperial College authorities. Mr. Murray investigated the causes of low percentage rooting at the Deparment's Cacao Propagation Unit and his recommendations should lead to the maximum output of cuttings from the Station.

AGRICULTURAL POLICY

5. The policy of the Department as indicated in previous reports has been formulated under six main Heads:—

(i) The Conservation of the Agricultural and Forest resources of the colony.

(ii) Security of Land Tenure.

(iii) The maintenance, expansion and improvement of the colony's main export crops.

(iv) The organization and improvement of peasant agriculture.

(v) The stability of farming systems and improvement of the food supply.

(vi) To encourage greater efficiency in the operations of production, processing and distribution of agricultural products.

6. These main Heads of Policy are being implemented as circumstances permit and within the limits of the trained staff and funds available.

PART I.

AGRICULTURE IN THE COLONY

METEOROLOGICAL CONDITIONS

7. Rainfall records were taken at 19 Stations — 9 on the Leeward Coast, 6 on the Windward Coast and 3 at Inland Stations in the higher rainfall areas. The principal meteorological station is in the Botanic Gardens, and the meteorological conditions of the year are summarised below.

8. The mean rainfall for 1951 was as follows:— Leeward Stations 95.09 inches, Windward Stations 133.33 inches, Inland Stations 150.12 inches. At the Botanic Gardens, the total rainfall was 86.07 inches, being 7.16 inches above the average for the last 25 years. The distribution was, however, uneven, there being an unusually high fall in May of 13.20 inches, (the highest in the last 21 years), and a relatively dry spell in October and November, being more intense than the average for the last 21 years. Yields of limes and sugar cane in the moderate rainfall areas were as a result adversely affected. Fifty-five per cent of the total rainfall fell in the period July to December, rain falling on 241 days of the year at the Botanic Gardens. The highest fall on any one day was 4.10 inches on the 10th May, 1951.

9. The mean absolute maximum temperature for the year was 86° and the mean minimum 72°F.

10. The mean pressure for the year was 29. 80 inches.

11. The mean relative humidity ranged between 75% at 9 a.m. to 67% at 3 p.m. being lowest in the months of March and April.

CONDITIONS AND PROGRESS IN THE MAJOR IINDUSTRIES

12. The total value of the Colony's domestic exports was $2,648,377 as compared with $2,064,970 for the previous year. A considerable part of this buoyancy was due to a rise in the volume and value of the banana industry, associated with a high level of investment and outturn of canned fruits by the canning industry, the effect of which is beginning to impress itself on the colony's economy. Prices remained firm for most of the colony's products with the exception of vanilla for which there was a steep decline in demand.

13. The Table of Exports for 1951 is published as Appendix I to this report. The adoption of a new form of presentation of Import and Export Statistics in conformity with the Standard International Trade Classification, precludes the publication for comparison of several years of statistical tables which have been a feature of these reports.

14. The table of Imports of the major foodstuffs, published as Appendix II shows that of the total imports of over 5 million dollars, 32% or over 1 million dollars went into the importation of foodstuffs of all classes. There is thus a vital need for greater local production within the limits of the labour and transportation resources of the colony.

AGRICULTURE IN THE COLONY

15. A marked feature of the agriculture of the colony in recent years is a turn towards the use of fertilisers, principally for bananas. The interplanting which obtains throughout the Colony with orchard crops, however, ensures that all crops should benefit by fertiliser applications.

16. Imports of fertiliser of all classes over the last 5 years is shown in the following table:—

Year	Quantity
	Long Tons
1947 ..	410.52
1948 ..	460.99
1949 ..	693.97
1950 ..	700.67
1951 ..	515.29

17. The conditions obtaining in the major industries of the Colony are dealt with summarily below:—

18. **Limes.**—The Table of Exports shows that there was some variation in the production of limes and its associated products, when compared with 1950. There was an unexpected drop in the production of raw juice which in 1950 had reached half a million gallons compared with 421,645 gallons in 1951. The reduction was due to a resumption in the demand for Lime Juice Cordial for which no demand existed in 1950. As a result, 296,731 gallons were exported valued at $182,877.72.

19. The market for Distilled Lime Oil continued to be buoyant and there was a slight rise in the volume and value of the trade. It is expected that recent local capital developments by a large firm in the trade will lead to an increase in production. 20,899 lbs. of distilled oil were exported as compared with 19,870 lbs. in 1950.

20. Prices ranged between $13.20 and $14.40 a lb. and prospects appear to be good for the next few years. It is of interest to note that West Indian distilled lime oil was offered on the London market in 1939 at prices varying between 12/6 and 20/– per lb. spot. During the war, when the price and supply of the oil were controlled by the Ministry of Food, the price ranged between 40/– and 50/– per lb. and since then it has risen and at the present time is quoted at 70/– per lb.

21. The continued high price level of distilled lime oil on the London market has been due very largely to currency restrictions arising out of devaluation, and although high prices are obtainable at the present time, the market is an uncertain and speculative one, and if, as it appears, other producing areas increased their output, prices would probably fall to a much lower level. The production of pectins by one local firm is a move towards that complete processing which is essential where an industry is based on one product alone. Production began with a small initial export of 35,538 lbs. valued at $402.81. Its contribution to the export trade will naturally depend on future market prospects.

22. The Lime industry continues to be the principle industry of the island, the annual export value of the industry approximately being $782,957.19 or approximately 30% of the total value of the colony's exports. The enormous increase in the demand for budded limes should if prices remain buoyant, lead to a significant rise in production in another five years.

23. The total production of limes in 1951 calculated as barrels of fruit is shown in the following table:—

Product		Calculated Barrels of Fruit	Percentage total crop
Distilled Lime Oil	20899 lbs.	58,623	60.00
Ecuelled Lime Oil	1358 lbs	10,864	11.11
Oils in Solution	—	27,416	28.05
Green Limes	—	775	.79
Pickled Limes	—	28	.002
Total		97,706	99.95
Average 1943/1950		105,540	

24. Although the 1951 figures show a total production of 97,706 barrels as compared with the eight year average of 105,540 barrels, they do not reflect faithfully actual production owing to the carry over of certain lime products from year to year. It appears, however, that until young groves come into bearing or greater efficiency is injected into existing cultivations, production is likely to be static around the year's figures.

25. **Citrus.**—Weather conditions were unfavourable to the citrus crop and poor crop resulted.

The Colonial Development Corporation Packing Plant for example could only find approximately 3,000 crates for packing, of an estimated citrus crop of 30,000 crates. Marketing and shipping remain the greatest problems of the industry. The loss of the Canadian market owing to lack of shipping in the war years and the unfavourable prices which obtained when shipping was resumed have dealt a serious blow to producers. A trial shipment by an exporter to the United Kingdom during 1951 resulted in financial loss. It is not yet known to what extent American subsidised fruit will affect the local industry, but it is feared that as the exportable surplus increases, the subsidies may prevent the industry from finding a remunerative outlet in European markets.

The West Indian market and a local cannery provide important outlets for the industry.

26. **Bananas.**—Progress in the Banana industry during the year is reflected in the fact, that for the first time, exports exceeded 500,000 stems compared with approximately 350,000 stems for the previous year.

27. A total of 567,517 stems yielding 11,659,800 lbs. were bought by Messrs. Antilles Products Ltd., the Contracting Company, with an overall island weight of 29.35 lbs. per stem or 76 stems per ton. The industry now constitutes 25% of the total value of the colony's exports and its value is considerably enhanced by the export of canned bananas. The entire industry yields a revenue of $915,583.60 to the colony.

28. The production figure might have been considerably more, were it not for severe damage caused to cultivations in the Southern and Middle districts by heavy gales in the first week of September which caused a temporary suspension of shipments. The Contracting Company, however, was later able to arrange for tri-weekly shipments with ships from Jamaica, until production recovered sufficiently to warrant the resumption of fortnightly shipments.

29. In order to reinstate the storm damaged areas, Government made available to growers, a loan of £15,000 which was, however, not

lifted, as those concerned appeared unwilling to put up the necessary security. A steep rise in the cost of fertilizers, hired labour and transport led to a price revision during that year by which the normal contract price increase due in July, 1952 was brought forward, the grower receiving a net price of 4 cents per lb.

30. A modification of the existing contract took place, and the Banana Associaton in order to streamline expenses, empowered the Contracting Company to purchase bananas direct from the producers for a period of one year. The Association agreed to transfer to the Company .20 cents per lb. of the .25 cents per lb. collected as cess for admininistrative purposes, but retained the right to collect further the .25 cents per lb. which represents the cess imposed on the grower for Leaf Spot Control Services.

31. **Leaf Spot Control Board.**—During the year, it was decided to set up a Statutory Banana Leaf Spot Control Board to deal exclusively with disease control. The Agricultural Superintendent is Chairman of the Board, and representatives of the Banana Association participate in running its affairs. The Board is financed from a cess levied on the Industry, and Government guarantees its borrowing powers up to a limit of $60,000, from the Bank. Equipment and materials are supplied free to growers, and a field staff supervises spraying operations. By the end of the year a comprehensive order for machinery was put through and the organization should help to reduce greatly the incidence of Leaf Spot.

32. The rapid growth of the industry over the last five years is shown in the table below:—

Year	No of Stems exported.	Value $
1947	7,263	7,344.00
1948	14,731	14,142.00
1949	120,676	141,474.00
1950	349,675	557,999.00
1951	516,517	720,527.68

33. An interesting feature of the banana industry is that a fair quantity of bananas is used for canning. The importance of processing to the economy of the colony is indicated by the fact, that in its first year of operations, the canning factory exported 567,821 lbs. of canned bananas at a value of $195,055.92. This represents a most useful outlet to the grower for his 'reject' fruit, but it is still too early to state what are the permanent chances of success of such a relatively new industry. The value of this industry to the grower is shown by the fact that during the year, 12,235 stems of an average weight of 16 lbs. brought approximately $6,000.00 to the producer.

34. The prospects of the industry appear to be reasonably good and a target of eighteen to twenty thousand tons is set for 1952. This target, although high, is not unattainable, but is dependent on (1) more people becoming engaged in the industry, (2) better communications, internal and external, (3) market prospects, (4) the absence of any major catastrophe such as a hurricane, (5) more efficient cultural methods, (6) more widespread and efficient disease control, (7) more intensive capitalization of the land with a judicious expansion of acreage.

35. **Coconuts.**—There was a shortfall of about 24 tons of copra below the previous year's production of 668 tons, but there was an increase in the exports of nuts and coconut oil principally to Barbados and the Leeward Islands. The total export value of the industry was $181,787 as compared with $151,790 in 1950. A small proportion of the colony's crop is processed locally, so that figures of exports do not really reflect actual production. Nearly all the copra is manufactured in Malayan driers. One estate has installed a Chula drier. The

quality of the island's copra would perhaps qualify as Grade II or III but with a little more effort would reach first quality.

36. There has not been, until very recently, any large expansion of cultivations of coconuts in Dominica. The crop is eminently suited to the natural conditions, particularly the natural drainage which obtains, and planters should expand with selected nuts as rapidly as practicable.

37. **Vanilla.**—The spectacular rise of the vanilla industry during the war years and after was not maintained during the year, and exports fell to nearly half those of 1950 in volume and value. It is feared that the return of Madagascar beans on the U.S.A. market has softened the demand for the Dominica product, which failed to consolidate the war time market owing to bad processing and inadequate and belated inspection before export. Production for export amounted to 19,085 lbs. valued at $81,239.00 as compared with 34,781 lbs. valued at $184,860.00 in 1950. It is feared that the 1952 crop will decline still further.

38. **Cocoa.**—Exports of Cacao were slightly above those of the previous year with a substantial rise in value as a result of a high price level particularly on the U.S.A. market. 271,894 lbs. of raw cacao valued at $161,688 were exported as compared with 261,279 lbs. valued at $109,505 in 1950.

39. The future expansion of the cacao industry rests on the outturn of high yielding clonal material from the Cacao Propagation Scheme, which after an initially good start, ran into difficulties of low percentage rooting with resultant low output.

40. It is hoped that the recommendations made by Mr. D. B. Murray of the Cacao Research Scheme, I.C.T.A., will have the effect of bringing the Station up to maximum output viz. about 50,000 cuttings per annum.

41. **Coffee.**—There was a sharp rise in the exports of coffee as a result of a profitable market. Production rose from 2,472 lbs. in 1950 to 12,458 lbs. in 1951, valued at $7,608.68. This figure is very far below the colony's potential for coffee, and as communications improve, exports should double by 1952. It is of interest to record that this island was one of the world's largest coffee exporters in the 18th century with an export of nearly 5 million lbs. of coffee.

42. In view of the revival of interest in the industry, proposals have been submitted for an Entomologist to visit the island to study the Coffee Leaf Miner.

43. **Rum.**—Local production of this commodity amounted to 72,735 gallons of which 6,745 gallons were exported and valued at $18,586.69. Most of this rum was directed to the United Kingdom. This represents an advance over the previous year when 2,583 gallons were exported valued at $3,677.00. Most of the rum is consumed on the local market, and makes cane farming a very profitable enterprise for the small grower.

44. **Food Crops.**—The area devoted to food production appears to have suffered a gradual decline over the past few years and the position has been aggravated by the advent of the banana industry which provides a ready cash income to the small farmer.

45. Dasheen (Taro), Tannias and Green Figs (Bananas) constitute the main diet of the population and in 1939 there was even a surplus of these products for export. The claims of industry, and other alternative sources of employment as a result of a large influx of capital into the island, has drawn labour from the fields to earn wages, resulting in a decline in food production, and in a high level of imports, which make the cost of living unusually high for a small Caribbean colony.

46. An island wide Food Production Campaign was started towards the end of the year with the emphasis on more and better food, and the results should be apparent in 1952.

47. The standard of cultivation of the small farmer is poor, and has rested largely on a basis of shifting cultivation, which, with the advent of a Squatter Control Scheme, it is hoped at last to arrest. Yields could be improved by means of better varieties, better cultural methods and insect pest control. Measures are being taken to give practical effect to these obvious needs.

48. It is of interest to note that in spite of the apparent shortage of food, the colony exported 4,363 lbs. of Farine, 81 bunches of plantains, 35,440 lbs. of vegetables and $150.00 worth of ground provisions during the year.

PESTS AND DISEASES

49. **Citrus.**— The most serious pest during the year was the Citrus weevil (Diaprepes abbreviatus L.) which caused a fifty per cent reduction in the output of all citrus nurseries.

50. The incidence of withertip (Gleosporium limetticolum) on limes was normal and the fruit piercing moths continued to damage the late orange crop. It is estimated that some 20 to 30 per cent of the citrus crop is lost through the depredations of the moth.

51. Damage by rats was extensive, but the use of Warfarin by cultivators was reported as giving satisfactory control.

52. **Bananas.**— Leaf Spot was serious during the year and in areas with inadequate or no water did severe damage. With the provision of additional spraying equipment on order, it is hoped to bring the disease under control as far as practicable.

53. The Banana Borer did serious damage during the year, but estates with a high standard of sanitation suffered far less damage than those who neglected field sanitation measures.

54. **Vanillas.**— Vanilla Root Rot (Fusarium batatis var Vanillae) continues to be a menace to the industry, particularly in badly drained areas. There is as yet no satisfactory method of control.

55. A full report by Dr. A. J. Simmonds on the incidence of insect pests in Dominica is attached as an Appendix to this report.

OBSERVATION TRIALS WITH INSECTICIDES

56. **Aldrex.**—A small scale trial with Aldrex II was laid down in November 1951 to determine what would be its effects on the incidence of Citrus weevil. Three parts of Aldrex diluted in 15 gallons of water were sprayed over an area of 1,600 sq. ft. The soil was then thoroughly turned over and stirred with a fork. The operations were repeated and 867 citrus stocks were planted in the treated area. A control plot was maintained and the results will be available for the next Annual Report.

57. **Ditreen.**— An area of 2,700 sq. ft. containing 2,160 citrus stocks was treated with ¾ lb. Ditreen in 50 gallons of water. The results are not yet available.

58. **Agrocide.**— 12 lbs. of Agrocide were applied over an area of 14,210 sq. ft. containing 7,372 citrus stocks. The area was divided into three sections (a) 4 lbs. of Agrocide were applied over a mulched area (4,744 sq. ft.); (b) 4 lbs. were applied to the bare soil (4,740 sq. ft.); and (c) 4 lbs. were forked and incorporated with the first 3 — 6 inches of soil and then mulched over with lemon grass (4,740 sq. ft.). Results are not yet available.

PART II

WORK OF THE DEPARTMENT

(a) ADMINISTRATION

As already indicated, frequent changes in personnel during the year, and the absence of officers of senior rank, tended to interrupt the

administrative work of the Department. Brief summaries of the field work done during the year are given below:—

(b) EXTENSION

The main extension activities of the Department centered around:

(a) the supervision and management of 5 Agricultural Stations.
(b) the raising of large quantities of budded citrus and other economic plants;
(c) the inspection of Crown Lands suitable for Agricultural purposes;
(d) pre-planting inspection for citrus and cocoa with 'follow up' activities;
(e) the application of soil conservation measures;
(f) the supervision of breeding units in the districts and livestock extension work;
(g) crop valuations arising from the road development programme; and
(h) Produce Inspection.

Apart from these main heads of extension with their implied details, the Department also operated a Cacao Propagation Station, a Lime Experiment Station and administered the Goodwill Estate, a cane farming estate run on a share cropping basis, a Prison Farm, the Botanic Gardens and five public grounds.

(c) BOTANIC GARDENS

Ornamental Section: This section was maintained in good condition during the year, but the tail end of a hurricane which struck the South Western portion of the island on 2nd September, 1951, completely uprooted the following trees:—

1 Cassia Nodosa	
1 Pithecolobium saman	‡
1 Cananga odorata	‡
1 Swietenia mahogani	
1 Pongamia glabra	‡
2 Peltophorum ferrugineum	
1 Cedrela Toona	
1 Pterocarpus rohrii	‡
1 Grevillea robusta	‡
1 Mimusops caffra	‡
1 Chloroxylon swietenia	‡
1 Plumieria alba	
1 Peltophorum africanum	‡
1 Jacaranda mimosaefolia	
1 Garcinia morella	
1 Alstonia specii	
3 Berrya ammonilla	
1 Andira imermis	
1 Cupressus benthanii	‡
1 Bentinckia nicobarica	
1 Spathodea campanulata	
1 Tabebuia guaiacum	‡
1 Omphalea megacarpa	

(‡ Replaced).

The loss of 26 ornamental trees was a serious blow to a small but reputedly one of the most beautiful gardens in the world. The policy of maintaining replicates of varieties will enable replacements to be made, and indeed, by the end of the year, at least 10 trees had been replanted.

Economic Section:—

This section which is comprised mainly of citrus and bananas received a severe set back from hurricane, which destroyed a large portion of the citrus crop and seventy-five per cent of the banana crop. The section devoted to the growing of green vegetables was maintained and towards the end of the year 3,000 seedlings of tomatoes, cabbage, cauliflower etc. were distributed for sale to the public, in addition to 9,540 packets of various assortment of seeds.

The raising of budded citrus and other economic plants forms an important part of the activities of this section and the distribution of plants raised is dealt with under the head 'Plant Distribution.'

(d) *CROP OBSERVATION PLOTS:*

A large number of introductions were under observation during the year and those which showed promise were bulked up and multiplied for distribution to the Agricultural Stations for further observations.

The following crops were kept under observations:—

	Crops		*Observations*
Sugar Cane —	B. 4744	—	Promising
	B. 47419	—	,,
	B. 4362	—	,,
Legumes —	Cowpea	—	Very promising
	Green Grum	—	Not ,,
	Calapogonium Nucunoides	—	Extremely promising
	Indigofera Endecaphylla	—	,, ,,
	Indigofera subulata	—	Very ,,
Fodder —	Columbus	—	,, ,,
	Demerara Primrose	—	,, ,,
	Sweet Sudan grass	—	,, ,,
Vegetables —	Collard	—	Fair
	Italian Broccoli	—	Very Good
	New Zealand Spinach	—	Good
	Cucumber P.R. 3a.	—	Very Good
	Southern Giant Curled Mustard	—	Very Good

(e) *LIME STATIONS*

No critical trials on limes have been laid down on this station since the answers to the original objectives in laying it out were found viz. the investigation of the proper root–stocks for limes. The station can fairly be said to be at present an observation rather than an experiment station. Further introductions made in 1948 of new citrus varieties e.g. Ruby Grapefruit, Glenred Grapefruit, Calamondins Armstrong Seedless Orange, and Cleopatra Mandarin should yield information on the suitability of these varieties to local conditions.

There has been a progressive decline in total yields of the lime crop and senility is considered to be the main factor responsible. The whole station is in need of re–organisation and rehabilitation.

The crop yields of limes over the last five years have been as follows:—

1947	—	1,326	Barrels
1948	—	912	,,
1949	—	781	,,
1950	—	500	,,
1951	—	646	,,

The total revenue derived from the Station was $3,142.96.

(f) CACAO PROPAGATION STATION

(COLONIAL DEVELOPMENT & WELFARE SCHEME D. 941)

The following construction works were completed during the year (1) Quarters for the Cocoa Assistant, Foreman and Pupils; (2) Office, Storeroom, Garage and Pump House; (3) a Reservoir with a capacity of approximately 19,000 gallons; (4) a solar type Propagator with a capacity of 25,000 cuttings per annum and an "Open Type" propagator of similar capacity; (5) One storage and one hardening shed, one compost and one delivery shed.

Due to an inadequate supply of water to run the two propagation units at the same time, two bins of the open type propagators with a capacity of 2,000 cuttings per setting were converted into closed bins and were being made for the construction of a glass shed 60 x 50 feet but no funds were available. This shed is required to accommodate cuttings when the propagation units will be in full production.

413 cuttings and 32 buddings were planted out in Nurseries during the year. Two D.S. Clones which were planted out under observation were discarded and have been replaced by new selection. Approximately ¾ acre has been prepared for an additional Nursery. Regular routine work was carried out during the year.

Two Nurseries were maintained at the Station with the following Clones:

23 I.C.S.; 4 G.S.; and 10 D.S. Clones totalling 2,319 plants.

Buds of I.C.S. 32, 80 and 70 were received from St. Vincent during the year but very few plants were obtained from them due to the bud-wood arriving when stocks were not in a fit condition for budding.

Total No. of cuttings set for year	36,366
Total No. of cuttings rooted	13,450
Total No. of cuttings out of hardening bins ..	10,936
Percentage of rooted cuttings 36%	
Percentage of rooted cuttings out of hardeners 29%	

Analysis:—	15	I.C.S.	clones totalling ..	3,272	plants
	4	G.S.	„ „ ..	1,479	„
	12	D.S.	„ „ ..	6,185	„
			Total ..	10,936	

A total of 10,039 cuttings were distributed during the year as follows:—

Estates	—	8,280 cuttings
Peasants	—	1,759 „

These included 12 I.C.S., 2 G.S. and 8 D.S. Clones. Of the total number of plants distributed, a trial bulk shipment of 1,000 plants was made by sea to the Northern district and arrived in good condition.

Selection Work:-

Yield records and compatibility tests were continued at Clark Hall Estate on the same trees (7 in number) as last year with a view to further elimination of undesirable clones and narrowing down the group to the most suitable clones. Two of these trees have shown very good records for the past two years, and have been selected and propagated.

The possibility of making an island wide survey for local selections has been considered but this has so far proved impracticable owing to limited staff.

WORK OF THE DEPARTMENT

Inspection Work:—

Fifty–three visits were paid by the Cocoa Assistant to 27 Estates and 10 peasant holdings during the year. Cuttings were distributed to peasants in Districts through their District Instructors. There is a general tendency to allow young ground provisions to overcrowd cuttings.

Cuttings in banana plots are subjected to too heavy shade during wet season and too much exposure during dry season. Steps are being taken to correct this.

Owing to a progressive decline in the percentage of rooted cuttings on the Station the Services of a cacao expert from the Imperial College of Tropical Agriculture were requested and readily given by the College. By the end of the year, steps had been taken to put the recommendations into effect.

The following Table shows the decline in the percentage rooting which took place during the year:—

Table of % Rooting — Cacao Station

Month	Percentage Rooting
January	40
February	33
March	36
April	46
May	36
June	27
July	23
August	31
September	20
October	28
November	19
December	10

WORK OF THE AGRICULTURAL STATION (C.D. & W. Scheme D. 1052)

The Department maintains with funds provided by Colonial Development and Welfare five demonstration centres which are concerned with rationalizing and improving existing systems of agriculture in the areas served by these Stations. Brief summaries of the results of the work carried out on these stations during the year are given below.

La Plaine Station:— This station of 15 acres is situated on the Windward Coast of the island, which is relatively isolated from the chief town owing to lack of proper communications. The annual rainfall on this station was 152.90 inches compared with 142.47 inches for the previous year. Plant propagation is one of the important functions of this Station and 705 citrus plants were raised compared with 3,281 for the previous year. Little local demand appeared to exist for these plants and propagation in the future will have to be geared to existing conditions, based on crops of a non-perishable nature. Plots of yams and other food crops are maintained with a view to obtaining data on yields and for distribution as planting material to peasants in the area.

A half grade Holstein Bull is maintained on the Station, but only five services were recorded during the year. In the conditions of the Windward Coast, it would appear that a dual purpose animal of the Red Pool or Sahiwal — Jersey cross would be more suitable. The Berkshire

boar proved popular with farmers and 16 services were recorded during the year.

Londonderry Station:— This Station serves the Northern portion of the island which again is connected to the chief town by small launch services. Permanent areas of Citrus, Cacao, Coconuts, Avocado Pears, Vanilla, Pine apples, Pawpaw and Bananas were maintained during the year.

Citrus: The performance of the Citrus crop was good but the greater part of the crop was lost as a result of praedial larceny. The reported yields for the year were 816 barrels of Limes, 312 Oranges and 852 grapefruit.

Cacao: This consists of clonal cuttings established in 1946 to which additions were made in subsequent years. The performance of this plot is an excellent demonstration to the farmer of the potentialities of clonal cacao. High winds in September caused damage to some of the Cassia reticulata which was the shade tree in use. Although suitable in many respects, the branches of this tree are brittle and under the high wind velocities of this island, break easily, thereby causing damage to young cacao.

The following clones were planted during the year:— I.C.S. 98, I.C.S. 40, I.C.S. 16, D.S. 1, 3, 7, 9. Of the 8 clones planted on this Station, D.S. 1. D.S. 2 and D.S. 9 have been the most outstanding under the conditions obtaining.

Coconuts: This consists of Dwarf and Tall varieties. The Dwarfs were planted in 1946 and are in bearing. 281 were distributed during the year, but praedial larceny is rife with dwarf nuts. 22 of the 31 palms of the tall variety of coconuts have come into bearing.

Coffee: 17 seedlings of the Columnaris variety of Coffee from Puerto Rico were planted out in January 1945 and made good growth. This variety flowers profusely at Londonderry and appears to bear heavily. The crop has hitherto never been reaped owing to the depredations of rats. It is hoped to start yield recording on the next crop.

Avocado Pears:— This plot was extended during 1951 and the following varieties were planted: 2 Trapp, 2 Butler, 2 Collinson, 2 Pollock, 2 Cock seedlings and Dominica Selections. The older trees did not bear fruit during the year. Heavy rains at the time of flowering caused a total loss of crop.

Vanillas:— Root disease caused the death of nearly all the vines on the station. An experiment consisting of five drained and five undrained blocks with applications of superphosphate, potash, lime and superphosphate with lime did not appear to give any discernible differences between treatments. The layout was not susceptible to statistical analysis.

Pineapples:— A small plot was maintained during the year and 130 pines with average weight of 4 lbs. were reaped. Of these only 23¾ lbs. were sold, there being no demand for the balance.

Papaw:— A small plot of 25 plants planted 10 x 10 feet bore heavily but most of the fruit remained on the trees and dropped as there was no demand for them in the area. The fruits were evidently not suitable for the local market being of an unusually large size. Fruit piercing insects caused a great deal of damage.

Bananas:— Two large observation plots were established in the period March to May — Plot No. 1 consisted of 326 suckers and a ferti-

lizer application of ½ lb. per sucker of the complete fertilizer (5: 10: 10) was made in two doses one in July and the other in October. By September, 50 suckers had shot fruit and there was only a mild infection of Leaf Spot. Full details will be available for the next annual report.

Plot No. 2. consisted of 402 suckers planted in May with Sulphate of ammonia only at the rate of ¼ lb. per stool applied in two dressings in July and November respectively. By November, 30 suckers had shot fruit. A heavy cover of Tephrosia cadida was maintained.

A mild to medium infection of Leaf Spot was observed in both plots in December.

Strip Cropping:— This is a peasant demonstration project where soil conservation measures are used. The strips are planted alternately with fodder grasses and cultivated crops. A planned rotation using roots, cereals, legumes and fodder is used. On completion of the rotation, the cultivated strips and the grass strips will be interchanged. Using this method, ⅛ of an acre was planted with Yams of the Yellow Red Lison and Oriental varieties in April and 1/10 acre in Tannais. The Yam crop was reaped in January and yielded at the rate of 3,200 lbs per acre. Tannias reaped in February yielded at the rate of 2,050 lbs. per acre. Sweet potatoes reaped in May at the rate of 928 lbs. per acre. Corn planted in March and fertilized with Superphosphate at the rate of 500 lbs per acre yielded only 1,728 lbs per acre. In contrast to this low yield of corn, a full acre was planted out in another field at the same time and a manurial application at the rate of 400 lbs. per acre of 18: 8: 4 resulted in a yield of 8,522 lbs. corn on cob.

The extremely low yields tend to indicate a soil of initially poor fertility, and it is hoped that by conservation and manuring, yields will be considerably increased.

Portsmouth Station: This station is also situated in the Northern District about 18 miles from the Londonderry Station and the general programme of work follows the same lines.

Permanent crops of Dwarf Coconuts and Mangoes, Bananas and Food Crops are maintained together with stud Units .

Both the Coconuts and Mango Plots declined during the year, but applications of fertilizers effected a great improvement by the end of the year. 1,563 lbs. of Bananas were sold up to June, 1951.

Food Crops:— Plots of Yams of the Lisbon, Yellow, Silk and Cushcush Varieties were established as well as Sweet Potatoes and Corn. Vegetable production has not proved very successful so far.

Livestock: The grade Holstein Bull and the Berkshire boar performed 39 and 3 services respectively.

Plant Propagation: 2,815 Citrus Plants, 104 Dwarf Nuts, 513 Cacao Cuttings and 24 grafted mangoes were raised and distributed during the year. In addition, 8090 citrus stocks and 300 mango stocks were planted for budding in 1952. 196 packets of vegetable seeds were sold.

At the sub station of Vieille Case in the Extreme North of the District, 1744 Citrus plants were raised and distributed and 3800 stocks planted. 472 packets of vegetable seeds were sold.

Financial:— At this Station there was a total expenditure of $3411.79 of which 31 per cent was absorbed by plant propagation and 54% in overhead expenditure. The number of man and woman days utilised were 514 and 317 respectively.

Colihaut Station:—

This is a small station situated on the Leeward coast of the island in a relatively low rainfall area. Here the main activity has been plant propagation in which 1,900 Citrus plants were raised and distributed. In addition, there are excellent demonstration plots with conservation measures where strip cropping is carried out with food crop.

It is intended to expand the livestock side particularly with stud goats and pigs of which the area already has a fair population.

The total revenue derived from this Station was $267.36 as compared with $106.88 in the previous year. In an area, however, which has been considerably eroded, the dividends must be looked for, not in revenue, but in the influence of the Station on Agricultural practices.

Some modest, if slow, progress has been made since the establishment of the Station and it is estimated that some 35 acres of peasants lands are under conservation.

Grand Bay Station:

This station serves the south and south-western portions of the island and comprises about 15 acres.

Changes of personnel interrupted the programme of work, as well as adequate funds for maintenance owing to a steep rise in wages of labour.

Citrus: 18,000 Citrus Stocks were raised for budding, comprised of Wild Grapefruit, Seville Orange and Sour Orange. In addition 200 Citrus Mitis stocks were planted for trial and observation. A severe attack of Citrus Weevil made heavy inroads into the stock population which was reduced to 10,000 by year's end.

Food Crops: The Station carried an excellent demonstration of a strip crop rotation based on roots, cereals and legumes. Yields on this Station are relatively high and the following were recorded during the year:—

Crop	Yield per acre (lbs.)
Sweet Potatoes (B44)	9,583 lbs.
Sweet Potatoes (local)	8,360 lbs.
Peanuts	1,045 lbs.
Bananas	10,159 lbs.
Yams (mixed)	6,320 lbs.
Kentucky Wonder Beans	11 tons.

Coconuts : The dwarf nuts on the Station have proved disappointing, nearly half the trees being shy bearers.

LIVESTOCK

The Livestock Officer, appointed under Colonial Development and Welfare Scheme D. 1468, arrived in the Island in July and assumed duties.

A tour of the island was undertaken to assess the possibility of Livestock Development under varying climatic conditions. A programme for Livestock Development, a tentative livestock policy and details of a scheme for the establishment of a Central Livestock Farm were prepared and submitted to Government.

The Caribbean Commission inaugurated a useful monthly statement of the incidence of contagious disease in the Caribbean. A Draft Ordinance modelled on the Jamaica Animal Disease Law was submitted to Government.

Fowl Cholera was in evidence in the Colony and was diagnosed by the Veterinary Officer, Windward Islands. Protective vaccination of all flocks on Agricultural Stations was carried out. Four poultry houses and pens were constructed at the Botanic Gardens, and fifty Rhode Island Red Chickens flown in from British Guiana to form the nucleus of a breeding flock.

Work was initiated on the organising of the Livestock Section of the Agricultural Stations.

Stud Units of the Agricultural Stations:— The inventory of stock on Agricultural Stations during the year is shown in Table I below:

INVENTORY OF LIVESTOCK AGRICULTURAL STATIONS

DATE	ANIMALS	STATIONS								
		La Plaine	Grand Bay	Botanic Gardens	Goodwill Estate	Colihaut	Ports-mouth	London-derry	Total	Remarks
	Bulls	1	1	–	2	–	1	1	6	None at Colihaut.
	Cows	–	4	–	–	–	3	7	14	
	Calves	–	1	–	–	–	2	–	3	
	Poultry	2	33	–	–	2	–	9	46	
	Sheep	2	1	–	1	–	1	1	6	
	Pigs	1	1	–	5	–	1	1	9	
	Horses	–	–	6	–	–	1	1	8	
	Mules	–	–	2	–	–	–	–	2	
	Donkeys	–	–	–	1	–	–	–	1	
					INCREASES DURING 1951					
	Bulls	–	–	–	–	–	–	–	–	
	Cows	–	–	–	–	–	–	–	–	
	Calves	–	2	–	–	–	2	3	7	
	Poultry	3	–	–	–	6	5	6	20	
	Sheep	1	–	–	–	–	–	–	1	
	Pigs	–	–	–	–	–	–	–	–	
	Horses	–	–	1	–	–	–	–	1	
	Mules	–	–	–	–	–	–	–	–	
	Donkeys	–	–	–	–	–	–	–	–	
					DECREASES DURING 1951					
	Bulls	–	–	–	–	–	–	–	–	
	Cows	–	–	–	–	–	–	–	–	
	Calves	–	2	–	–	–	–	1	3	Two by sales and one by death
	Poultry	2	10	–	–	–	–	2	14	By death.
	Sheep	–	–	–	–	–	–	–	–	
	Pigs	–	–	–	–	–	–	–	–	No decrease.
	Horses	–	–	–	–	–	–	–	–	
	Mules	–	–	–	–	–	–	–	–	
	Donkeys	–	–	–	–	–	–	–	–	
	Bulls	1	1	–	2	–	1	1	6	
	Cows	–	4	–	–	–	3	7	14	
	Calves	–	1	–	–	–	3	2	6	
	Poultry	3	23	–	–	8	–	13	47	
	Sheep	2	1	–	–	–	1	–	4	
	Pigs	1	1	–	5	–	1	1	9	
	Horses	–	–	9	–	–	–	–	9	
	Mules	1	–	–	1	–	–	–	2	
	Donkeys	–	–	–	1	–	–	–	1	
TOTAL		8	31	9	9	8	9	24	98	

Increase and Interchange of Stock: There were interchanges of stock within the stations during the year. The number of stock on hand at January 1st was increased by the birth of seven calves, one ewe sheep and by the hatching of 20 chicks.

The number of studs which stood for service on the respective stations are shown in Table II below:—

TABLE II —STUDS ON STATIONS 1951

STUDS	La Plaine	Grand Bay	Botanic Gardens	Goodwill Estate	Colihaut	Ports-mouth	London-derry	Total	Remarks
Bulls	1	1	–	2	–	1	1	6	None at B.G. & Colihaut.
Ram & Sheep	1	1	–	1	–	1	1	5	– do –
Boars	1	1	–	2	–	1	1	6	– do –
Stallions	–	–	2	–	–	–	–	2	Stallions at B.G. only.
	3	3	2	5	–	3	3	19	

TABLE III — STUD SERVICES 1951

Studs	L/derry	P/Mth.	Colihaut	Goodwill Estate	Botanic Gardens	G/Bay	La Plaine	TOTAL
Bulls	9	32	–	35	–	23	5	104
Boars	15	3	–	20	–	–	16	54
Ram/ Sheep	10	–	–	1	–	7	–	18
Stallions	—	–	–	–	6	–	–	6
	34	35	–	55	6	30	21	182

An increase of 29 Service over 1950.

The stations continued the policy of offering subsidised stud services to stockowners and although full use was not made of some of the studs on a few stations, yet they performed a useful public service.

The three major stations, Grand Bay, Londonderry and Portsmouth, operated soiling units as a means of demonstrating mixed farming and soiling methods to the public. It is hoped that the knowledge gained from these units will find its way to the peasantry.

The animal products obtained on the stations during the year is shown in Table IV below.

TABLE IV.

STATIONS	Milk (Qts.)	Eggs (Nos.)	Remarks
La Plaine	—	30	No Cows
Grand Bay	306	253	2 cows, 19 hens
Colihaut	—	48	4 hens
Londonderry	—	112	7 hens
Portsmouth	—	—	—
Botanic Gardens	—	—	Horses only
Goodwill	—	—	Studs only
	306	443	

The difficulty of feeding balanced rations to the various classes of stock maintained was little eased during the year. Emphasis was laid on fodder grasses and legume production and on producing some amount of maize to ease the feeding situation.

The feeding of imported concentrate mixtures continued within the limits of available funds. Simple feeding formulæ for blending of home grown substances were drawn up but the unavailability of the ingredients made it impossible to bring the formulæ into use. Mineral supplements were made available to all stocks.

Animal Health :— Few minor cases of illness occured and were promptly treated. The inventory of stock was reduced by the loss through death of two calves, ten fowls and one pig. The fowls on the respective stations were inoculated against cholera. On the whole the health of the animals was good.

General:— Nine visits were paid to outlying Agricultural Stations and direction given on the care and management of the various classes of stock maintained. Increased interest in the care and management of stock was evinced and few visits were paid to the Stations by the farming community in the interest of livestock. Various exotic legumes and Sorghums were introduced at the Botanic Gardens and towards the end of the year were finding their way to the Stations and into the hands of interested private livestock owners.

Privately owned Livestock :— Privately owned Livestock received careful attention. A great deal of time was spent with farmers assisting them in every aspect of Livestock Development. The demand for service was greater than could be attended to and is an indication of an awakening interest in livestock work. Two plans for the construction of livestock shelters were drawn up and two shelters constructed under direction. The studs of the Agricultural Stations showed their influence to some extent on privately owned stock. Quite a few births to privately owned stock as a result of service from the Station studs were recorded by the various stations.

The necessity for proper housing, feeding, management and the use of minerals were emphasised and one business farmer undertook the importation of Minerals for feeding to his animals .

Sixty-nine visits were paid to peasant farmers and privately owned estates.

One hundred and twelve male animals unsuitable for breedin were castrated.

Six hundred and seven fowls were vaccinated against Cholera. Five cockerels were caponized. Forty–five animals were examined for reported infertility and the certificates for slaughtering were allowed. Ninety animals were treated aganist internal and external parasites.

Municipal and Police Force Animals :— Effort was directed at con–trolling the promiscuous slaughtering of female stock. Close co–operation was maintained with the Marketing Depot, Livestock Owners and the municipal abbatoir. Of seventeen female animals presented for slaughtering, eight were passed as possibly infertile and nine were disallowed and retained for breeding. In nearly every case the animals presented for slaughtering were examined as to their usefulness for future breeding before slaughter was allowed. Although the service of examining the animals was confined to Roseau and its environs, yet the number of females that would have been slaughtered was reduced. The summary of animals slaughtered at the Abbatoir showed a reduction in the number of females slaughtered from July to December. The summary of animals slaughtered at the Abbatoir during the year is shown in Table V.

TABLE V

Animals slaughtered at the Abbatoir during 1951

Bulls	Oxen	Cows	Heifers	Sheep	Goats	Pigs	TOTAL
144	12	73	11	10	—	34	284

The municipal animals received fair attention. Two visits were paid to the Police Force Horses and one visit to the Town Board Animals.

Three dogs were examined and one permit for export was granted.

Importations : During the year several animals were imported into the Colony for the purpose of food and for rearing. The animals in most cases were accompanied by veterinary certificates and were nearly all inspected on landing. The animals imported and the source from which they came are shown in Table VI below :

TABLE VI

Animals	No.	Purpose	Source	Remarks
Cattle	8	Food	L. Is. French & Netherland W.I.	1 Holstein Cow for rearing.
Poultry & Game	20	,,	Leeward Islands	For rearing
Sheep & Lamb	20	,,	–do–	–do–
Swine	20	,,	L. Is. French, Netherland W.I.	
Goats	13	,,	Leeward Islands	
Horses	3	Rearing	Trinidad, L. Is.	
Asses	2	,,	Leeward Islands	
Mules	8	,,	–do–	
Dogs	3	,,	French W.I. & L. Is.	
Total	84			

WORK OF THE DEPARTMENT

Livestock Health : The Veterinary Officer, Windward Islands, paid two visits to the colony and undertook several useful jobs. One herd of cattle and a herd of pigs were T.B. tested. Three cows and one sow which presented difficulty in breeding were treated with female hormones with success on the cows and negative results on the sow. Several cases of Fowl Cholera occurred in the Island during the year. The malady was diagonsed in June and protective inoculation and sanitary measures to control the disease were immediately inaugurated. Apart from the incidence of Cholera and Roup of poultry there was the prevalence of internal and external parasites of all classes of domestic stock and careful attention was paid to localising outbreaks and eradicating the various maladies.

General : Investigations into the possibility of obtaining suitable high protein feeds revealed the possibility of development of grass legume mixtures for cattle, but the provision of grains and other concentrates for the feeding of other classes of stock present some difficulty.

The possibility of producing a suitable livestock feed from citrus waste is being investigated and farmers were observed ensiling citrus waste for feeding. It is believed that the usefulness of citrus waste as a source of feed could be greatly improved.

During the year farmers complained of a high percentage of non-breeders among their animals and it is believed that a high percentage of infertility exists among cattle. The true cause calls for thorough investigation but it is believed that the high acid intake caused through the feeding of large quantities of citrus skin in the raw state may be a contributory factor.

During the year two publications were issued in the press and one pamphlet was prepared on the Identification and control of Fowl Cholera.

EXTENSION WORK

Although the Department of Agriculture was established in 1895, real extension work began only in 1943 with Colonial Development and Welfare Funds. The work has suffered from lack of senior qualified personnel to give direction to implementing policy.

During the year there were only one Agricultural Assistant and two Instructors of senior rank with seven Grade II and seven Grade III Instructors in the field. Provision is made however, for an Assistant Superintendent, a Livestock Officer, three Agricultural Assistants and sixteen Agricultural Instructors of varying grades.

The lack of communications and the disordered terrain of the island make the application of satisfactory extension methods peculiarly difficult. In some areas it is possible to maintain personal contact with the farmer, but over large and rugged mountain areas, a special approach is required. Proposals for a 'mountain squad' of special Conservation Instructors were under consideration to meet the requirements of the 'squatters'. On the Windward Coast due to ineffective transport the farmer is unable to market his crop or exchange the wealth he produces for what he cannot produce.

Extension Policy aims at 'in training' courses for the staff in the technique of extension and a gradual infiltration in the district by a team of junior and senior officers concerned with making the farmers aware of the need for advisory services. Absence of a daily press and other vehicles of information to the community is overcome by personal contact, the pulpit, the distribution of leaflets and group meetings. A factor of great importance which tends to offset these disadvantages is a surprising responsiveness of a large section of the planting community who possess a great love for the land.

WORK OF THE DEPARTMENT

The Department maintains five Agricultural Stations in strategic areas of the Colony and some valuable work is done through these stations. 'Follow up' work is always in progress and the general observation is that peasant farmers with security of tenure make good use of the land and take good care particularly, of economic plants obtained from these stations. "Squatters" on Crown Lands on the other hand who farm on a basis of shifting cultivation, often abandon their permanent crops when they abandon their gardens. A 'Squatter Control Scheme' has been designed to arrest such shifting cultivation, and the introduction of an Agricultural Small Holdings Bill is essential if there is to be any significant development. The combined visits of the field staff to peasants' holdings and estates totalled about 2,000. Inspection showed that some 349 acres of small holdings and 160 acres of Estates were put under simple soil conservation methods. Requests have come from planters for assistance in applying these simple conservation practices to their entire estates.

In the Northern, Leeward and Southern Districts, three peasant holdings have been selected with the aim of (a) effecting soil conservation measures (b) arranging the cropping system in permanent crops, semi-permanent crops, catch and cover crops and fodder.

Although the work is by no means complete, there is a great demand from the peasants for guidance from the Department's officers in laying out similar trials for them. The advent of the Forest Service now engaged in arresting shifting cultivation should have the effect of bringing the full weight of the extension service to bear on peasant agricultural developments.

One field Day for planters and peasants was held at the Cocoa Station when opportunity was taken to demonstrate the entire routine of cacao propagation and cultivation.

Another field day was held in the Windward District when an entire village turned out to give voluntary help in soil conservation work.

PRISON FARM

The Prison Farm consists of 2.084 acres, .84 of which is devoted to food crops, the remaining 1.244 acres being taken up by sheds, paddocks, fodder grass, pathways, hedges and anti-erosion barriers.

(a) **Cultural Methods**: It is located in a drought-susceptible area on sloping land exposed with a heavy soil-type. The main objectives of all cultural methods were soil and water conservation, and improved soil-fertility.

(*b*) **Manures.** Three hundred and sixty-five (365) lbs. of artificial fertilizers (10:8:4) and 10 tons of pen-manure were used for the year. All the pen manure (10 tons) plus 1/3 of the artificial fertilizer (12 lbs) were used on food crops, while 2/3 of the artificial fertilizer was used on the fodder patch. Of the 10 tons pen manure used 1 ton was produced on the Farm by stall fed animals owned by tenants, but housed for certain periods, (e.g. when grass is plentiful) on the farm.

A Pen was provided for this purpose, built of round wood and wattle with a thatched roof, made to accommodate six head of cattle with a small exercise paddock adjoining.

A pen of similar construction was built for sheltering the farm personnel. A latrine was also installed during the year.

(*c*) A limited range of crops was grown on the Farm due to seasonal factors, hence an ideal rotation system presented much difficulty. However, the cropping system was kept as close as was practicable in

conformity with a sound rotation system as the cropping order for the year shown below will show.

PLAN OF ROTATION

Strip No.	Plot No. 1	Plot No. 2	Plot No. 3	Plot No. 4	Plot No. 5
1	Yams	Potatoes	Potatoes & Tomato	Peanut, Corn, & Bananas	Peanut, Corn & Bananas
2	Yams	Beans & Sweet Potatoes	Cassava & Beans	–do–	–do–
3	Yams	Beans, Potatoes & Cucumber	Tannias	Beans & Tannias	Fodder
4	Legumes	Cucumber & Potatoes	Fodder	Fodder	Fodder
5	Beans & Tannias				
6	Fodder	Fodder			

(*d*) The cropping area is divided into 5 plots which are separated by belts of Tephrosia Candida and Pigeon Peas, each plot being sub–divided into strips which are bounded by contour drains and vetivier grass.

TABLE OF CROP YIELDS

CROP	AREA	YIELDS Per Plot	YIELDS Per Acre	REMARKS
Sweet Potato	.10 acre	891 lbs	8,910 lbs	This crop suffered heavy loss from larceny.
Corn	.20 „	200 „	1,000 „	These figures refer to dried grain off–cob.
Tomato	.12 „	538 „	4,486 „	Birds took heavy toll.
Yam Lisbon 38	.12 „	2,600 „	21,666 „	Suffered heavy loss from larceny.
Yams mixed	.12 „	1,290 „	10,750 „	Suffered heavy loss from larceny.
Peanuts	.08 „	125 „	1,562 „	Affected by rats to a negligible extent.
Carrots	.10 „	200 „	6,000 „	Ditto.
Egg Plant		156 „		
Pumpkin		140 „		
Peas & Beans		70 „		Thieves took heavy toll.
Cucumber		19 „		
Radish		15 „		

(*e*) **Bananas**:— Three hundred plants were planted at distances 8′ x 8′ apart. Due to a shortage of labour the follow-up cultivation was somewhat neglected, which resulted in poor development of the young plants. Twenty-five lbs. of pen-manure was incorporated into each hole at planting time.

Prædial Larceny was rampant, over 10 cases having been recorded for the year. Needless to say, this had an adverse effect on crop yields.

(*f*) **Pests and Diseases** :— The Corn crop suffered some slight damage from the Corn Ear Worm. Tomatoes were seriously affected by birds. There were also a few isolated cases of wilt. Pigeon Peas were seriously affected by pod-boring caterpillars. Generally, incidence may be said to have been slight.

(*g*) **Bee Keeping**:— Bee keeping was introduced as a new feature of the farm. A hive which originated from pure-bred Italian stock was purchased and installed in November. There was a short flow on and the bees began work immediately, but unfortunately a dearth followed, which resulted in cessation of all storage activities in the hive. Progress was made, however, and the hive was in sufficiently good condition to catch the first flow.

(*h*) **The Farm** was worked exclusively by prison labour. Throughout the year an average size gang of 5 men with a warder in charge was detailed for work on the Farm, 5 days a week. The working of the farm was frequently interrupted for periods of 5 days or more on a stretch, e.g. when the warder was ill in August and before this, during a strike two weeks in April and May.

This system of standard labour along with frequent changes and low efficiency attendant on prison labour, proved very unsatisfactory. There were times during the year when 5 men were more than enough to cope with the work, while at other times the same number proved grossly inadequate.

PLANT INTRODUCTION AND PROPAGATION

A total of 22 introductions were received from the United States, British Guiana and Trinidad. Introductions of particular interest were 5 varieties of cowpeas and other Leguminuous crops, and a number of promising forage crops and sorghums, notably Uganda and Columbus grass.

During the year the demand for budded orange and grapefruit plants switched over to limes as a result of the decision of the Colonial Development Corporation not to proceed with the development of Castle Bruce Estate as a citrus plantation. The result was a carry over of large quantities of plants in the nurseries, and as the supply of lime plants was limited, the policy had to be changed to meet the existing demand. Seventy-five per cent of the nurseries were therefore devoted to raising budded limes.

Attempts to develop a Black Pepper Industry was begun towards the end of the year and the results were most encouraging.

The distribution of budded and grafted plants for 1951 was as follows:—

West Indian Limes	15,968
Valencia Oranges	5,280
Washington Navel Oranges ..	2,078
Other varieties (oranges) ..	3,393
Mandarin and Tangerines ..	114
Grapefruit	2,070
Citron	553

Other economic plants distributed were:—

Dwarf Coconuts	483
Robusta Coffee	613
Avocado Pears	127
Julie Mango	40
Bombay Mango	29
Lacatan Suckers	569

Cacao Cuttings	128
„ Seedlings	675
European Vegetable Seedlings ..	2,978
European Seed Packets ..	9,540
Miscellaneous	77

In addition, a total of 417 ornamental plants were distributed during the year.

The following were sent on request to various countries during the year:

50 lbs Wild Grapefruit seeds
50 Coconut Plants
Rooted Cocoa Cuttings
30 Ornamental Plants
11 Sweet Lime Plants (Limonia acidissima)
2,000 Banana Suckers
15 Washington Navel Orange Plants
18 Eucharist Lily Bulbs
300 Patchouli Cuttings

GOODWILL NURSERIES

Nurseries (1950–51) fell short of the target. Of a total figure of 28,000 stocks, only 12,040 budded plants fit for distribution were produced, i.e. 43% of the total target. Most of the damage can safely be attributed to root–grub attack, the incidence of which was abnormally high in the nurseries that year.

Roaming stock, especially sheep, are becoming a very serious nuisance and are the cause of much damage to newly budded plants and seedlings just past germination stage.

Nursery (1951-52). A new sight was used for this nursery. Great care was exercised in laying out this nursery in conformity with sound soil conservation principles.

Transplanting of seedlings to stock beds commenced June 13th 1951, and was carried on well into December. This extensive transplanting period was due to the backwardness of seedlings which suffered a serious setback from grub–attack and other minor causes.

At the close of the transplanting period in December the numbers and varieties of stocks planted out were as follows :—

Wild Grapefruit	18,500	
Seville	6,000	
Sour Orange	1,500	— 26,000

A target figure of 26,000 stocks, 75% of which is to be budded to W.I. Limes and 25% to other sweet citrus varieties.

PRODUCE INSPECTION

Thirteen Depots were established for the purpose of inspecting and selecting vanilla beans before they were sold locally. Each depot was supervised by the Vanilla Examiner, until towards the end of the year, it was decided to abolish district depots and examine the beans at the shipping houses immediately before export by one Produce Inspector.

The following tables show the crop for the year with a comparison of the previous year's crop and a summary of the 1951 crop :—

	GREEN BEANS		CURED BEANS	
	Accepted	Rejected	Accepted	Rejected
1950 ..	140,372	4,384	8,724	116
1951 ..	56,793¾	315½	14,285¾	—

APPENDIX II — AGRICULTURAL LEGISLATION

The 1950 crop was much greater than the 1951 crop. There is every reason to believe that the coming crop will be much below that of 1951.

SUMMARY OF 1951 CROP

Buying Depot	GREEN BEANS (LBS)		Cured BEANS (LBS.)	
	Accepted	Rejected	Accepted	Rejected
Roseau ..	18,373½	58	12,394½	—
Mahaut ..	1,895½	10	20	—
St. Joseph ..	12,085	91¾	—	—
Colihaut ..	5,206¾	103	—	—
Coulibistrie ..	9,970½	—	—	—
Portsmouth ..	6,869½	—	46	—
Vieille Case ..	—	—	—	—
Marigot ..	—	—	1,751½	—
Castle Bruce ..	596¼	13	52¼	—
Rosalie ..	377	8	11	—
La Plaine ..	—	—	—	—
Delices ..	101½	6	—	—
Grand Bay ..	1,318½	25¾	10½	—
	56,793¾	315½	14,285¾	—

During the season a minimum of 24 cents and a maximum of 48 cents were paid for green beans. The average price throughout the season was 36 cents. Cured beans ranged from $2.00 to $3.72 per lb.

The Depots from St. Joseph to Grand Bay were visited regularly. Those in the Windward Districts (Delices to Castle Bruce) received one visit. The Northern District was not visited.

The six big dealers' curing houses were visited regularly. Weather conditions were ideal and the high quality of the green beans sold resulted in excellently cured beans.

Total exports amounted to 19,085 lbs. cured beans, out of which 5,538¼ lbs were from the previous year's crop. Only 7 lbs of cured beans were rejected as unfit for export.

Cured beans amounting to 854¼ lbs were shipped to the sterling areas. From that amount 2 lbs were sent to the London Exhibition. The balance was exported to the dollar areas.

The prices received ranged from $3.50 to $2.50 — $1.90 U.S. Currency. Only a very limited amount was exported at $3.50 the bulk having realised no more than $2.50 downwards.

Due to the steady decline in price quotations, there is every indication that the coming season may not be too favourable to the vanilla dealer.

STAFF NOTES

Mr. L. L. de Verteuil, Agricultural Superintendent 1943-1951, left the Colony on transfer to Trinidad in July 1951. Mr. de Verteuil made a solid contribution to Agriculture in Dominica and laid foundations on which progress could be built.

Mr. L. Kong left the Colony on transfer to British Guiana in August, 1951.

Mr. E. Martin arrived in the Colony in August as officer-in-charge of the Department and left on 21st September 1951.

APPENDIX II — AGRICULTURAL LEGISLATION

Mr. St. George C. Cooper arrived in the Colony on 19th September, 1951, and assumed duty as Agricultural Superintendent.

Mr. P. H. Prince assumed duty as Livestock Officer in July, 1951, transferred from St. Vincent Department of Agriculture.

Mr. J. G. Stedman, Senior Agricultural Instructor, was seconded to the Banana Leaf Spot Control Board and resigned in July, 1951.

Mr. E. B. Hunte, Agricultural Instructor, resigned his appointment during the year, to take up the post of Inspector with the Banana Leaf Spot Control Board.

VISITORS

Distinguished visitors to the Department during the year were :—

His Excellency the Governor Sir R. H. Arundell, K.C.M.G., O.B.E.;

Dr. F. J. Simmonds of the Commonwealth Institute of Biological Control ;

Mr. D. B. Murray, Junior Plant Physiologist, I.C.T.A.;

Mr. N. W. Simmonds, Banana Cytogeneticist, I.C.T.A.

Dr. P. L. Willmore, Seismologist;

Dr. S. Bracewell, Director of Geological Surveys, British Guiana;

Mr. Wernick, Agricultural Adviser to the British American Tobacco Company;

Dr. M. V. Morris, Senior Veterinary Officer, Windward Islands.

AGRICULTURAL LEGISLATIONS

S. R. & O.

The Agricultural Produce Exportation (Amendment) No. 6 of 1951
Agricultural Scholarship (Amendment) Regulations No. 12 of 1951
Agricultural Produce Exportation (Amendment) No. 18 of 1951
The Crown Lands (Amendment) Regulation No. 19 of 1951
Crown Lands (Amendment) Regulation No. 22 of 1951
Citrus Fruit and other Fruit Regulations No. 44 of 1951.

ORDINANCES

An Ordinance for the purpose of combatting Cercospora Leaf Spot of Bananas. No. 13 of 1951.
An Ordinance to control the preparations for imports of Citrus and other fruit. No. 17 of 1951.
An Ordinance further to amend the Banana Ordinance 1934. No. 18 of 1951.

MISCELLANEOUS

The Agricultural Superintendent served during the year on the following Committees:

(a) Chairman Leaf Spot Control Board
(b) Chairman Goodwill Estate Committee
(c) Member of Banana Association
(d) Member Central Housing Committee
(e) Member Road Development Committee.

ACKNOWLEDGEMENTS

It is a pleasure for me to acknowledge the great assistance which I have received from the members of my Staff, the Administrator and the planting community in what was a difficult year. Their assistance made easy for me the task of writing this report.

PART III

ADMINISTRATION REPORT OF THE FOREST SERVICE 1951

Forest Policy:

Dr. Beard's proposals for a Forest Policy as outlined in Bulletin No. 11 of the Development and Welfare organization were adopted in principle on publication of his report and are summarised as a reminder:

(a) The execution, together with other Departments, of a Land Use survey of Dominica to provide the necessary data for land planning.

(b) On completion of (a) to draw up a complete land allocation and conservation policy for Dominica.

(c) To carry out Forest Reservation and to manage these Reserves in such a manner as to fulfil their protective function in the interests of soil and water conservation, and at the same time to provide the maximum outturn of forest produce on the basis of sustained yield.

(d) To carry out research in sylviculture, and utilization of forest products.

(e) To educate and train subordinate staff and the public to the benefit of a properly implemented Forest Policy and to the efficient use of Forest Products.

(f) To encourage private forestry and to assist in establishing Conservative management.

(g) To protect nature.

The Forest Estate:

(1) CROWN LANDS. There is little to add to the 1950 report. Reconnaissance work in the Crown Lands continued so that by the end of the year a reasonably clear picture was obtained of their extent, and of the part they play or may play in the life of the island. The position concerning squatters (illegal occupants of Crown Land) is discussed later in this report.

(2) PRIVATE LANDS. An increasing number of landowners have given lip service to, and a few practical demonstration of, the importance of maintaining a forest cover within their lands. There is a tendency however, to denude the land near to new roads for the sake of cordwood and charcoal rather than preserving such areas as production Forest. The short term view prevails.

Communications:

In no case has the Colony road programme resulted in making Crown Lands accessible. Until this s done the timber reserves which could be worked on a basis of sustained yield must remain untouched. For this reason private lands bear the brunt of timber, cordwood and charcoal supply to the detriment of accessible catchments.

Education:

Due to the absence of the Assistant Conservator on leave and sick leave the programme of lectures was discontinued. Field Staff carried on routine education and it is clear that maintaining good public relations is having a beneficial effect.

Staff:

Forest Service Staff strength remained at 1 Assistant Conservator, 1 Forest Supervisor, 4 Forest Rangers and 9 Guards. One Forest

Ranger resigned being replaced by promotion of a Forest Guard. Office staff remained unchanged.

Forest Reservation:

The proposed Roseau River Catchment Forest Reserve remained undeclared due to the Surveyor engaged upon this demarcation being needed for more important work. This has resulted in looseness of control in the Laudat village region due to the necessary powers for adequate protection being vested in legal declaration after survey. Control is good in the Crown Land section which covers the main part of the reserve.

Transinsular Road Forest Reserve. This small reserve of just over 1000 acres was demarcated and declared under the Forest Ordinance. The reserve covers land on each side of the Transinsular Road Trace connecting the main Northern and Southern roads. When the road is completed it is planned to work the area as a Production Forest.

Central Forest Reserve. This will form the main reserve for the North–Central portion of the island and will cover the headwaters of every major river and stream in the area. Progress in survey has been excellent and should be completed by early 1953 to add some 30,000 acres of the interior to the Reservation programme. Whilst the area is inaccessible today this may not always be the case and to have this tract under strict control, until such time as better use may be made of the land, is highly desirable.

Forest Protection:

Man continues to be the worst enemy of the forest but despite the fact that the Scheme for the Control of Government Lands (Squatter Control) did not mature as was hoped, forest destruction has been kept within bounds.

There was little damage from the high winds of early September.

The voluntary control system on private lands has proved most effective although the number of persons availing themselves of the help of the Forest Service remains small.

Forest Offences:—

	Cases	$
Compound	29	117.44
Court Cases	3	33.00
Outstanding on 31.12.52	22	
		$150.44

Utilization:

Pitsawn As can be seen from Crown Land sale figures the bulk of trees converted must come from private lands.

Hewnwood & Shingles This is mainly due to greater accessibility of, and to the lack of control of stealing on, private estates. It is clear that the Forest Service now is accepted as the controlling agents for a source of lumber. In the Northern District more and more timber workers are coming forward preferring to pay the very reasonable royalty to working on a share basis with the estates.

Charcoal Almost the whole output comes from Private Lands due to greater accessibility, and ease with which theft can take place, thereby encouraging illegal and free burning

Cordwood This comes from Private Lands and will continue to do so until there are roads through Crown Lands.

Other Produce Crown sales are small.

Crown Lands Produce Worked.	Value $	
Trees sold for sawing	579.69	
Trees sold for other purposes	84.14	
Cordwood	1.50	
Charcoal	3.75	
Minor Forest Produce	22.54	$691.62

Export of Timber. Export of sawn lumber and cordwood was reduced to a minimum in order to satisfy local demand. Charcoal export is prohibited.

Total export, the majority to Barbados, was as follows:—

Commodity	Quantity	Value $ (B.W.I.)
Firewood	465 cords	2,790.00
Fellows	1,699 pcs. ‡	701.41
Spokes	2,458 „ ‡	181.19
Yokes	276 „ ‡	49.68
Bamboo	266 „ ‡	26.05
Other wood	1,880 bd. ft.	415.54
		$4,163.87

‡ The volume of a 'piece' for customs purposes is taken to be about 1 board foot.

Imports. Imports, mainly of soft woods, must remain high so long as the majority of the island's forests remain inaccessible to mechanical methods of extraction and conversion.

Sawmilling. The only organized timber firm locally continued to work on a reduced output due to difficulty in log supply. The completion of the Transinsular Road will enable them to work to full capacity.

Timber Protection. Little progress has been made in encouraging timber preservation or anti-termite precautions. Creosote was declared import tax free to encourage its use.

Minor Forest Products. Production of Carib baskets, mats and other small items made from forest products continued on a small scale.

Revenue. Revenue figures continue to be disappointing. They will remain a minor item until it is realised that, due to inaccessibility, considerable revenue remains locked up in the interior.

Expenditure. Scheme D 1042.

Capital	$ 3,428.32
Recurrent	19,401.88
	$22,830.20

Forest Stations. The Brantridge Forest Station was fully finished and three houses on the Windward Coast were occupied during the

year. Plans were fully advanced for the seven final houses at the close of the year.

Sylviculture and Research. Due to the nature of Scheme D 1042 funds were not made available for such works. This is regrettable. There is nothing of note to report.

Preservation of Nature. The game laws are a dead letter due to the attitude of all classes of society toward them. The Department is fully aware that many prominent persons dynamite rivers and shoot protected birds and game out of season. With such a deplorable attitude shown by those who should know better, it is not surprising that control is most difficult.

Forest Squatting Control. Clearings made by Squatters increased during the year due to the staff being unable to retain full control of the mountainous areas which must be patrolled. This is not surprising and was anticipated, as the full scheme for Control of Government Lands had not been approved by the end of the year.

Arrangements were made during the year for payment of Survey fees by instalments. The system is working well and were the staff, especially surveyors, available, work in clearing up the Squatter problem would be under way.

The staff of the Interim Squatter Scheme remained the same pending approval of the full scheme.

Appointment. Mr. L. L. de Verteuil, Agricultural Superintendent and Chief Forest Officer, was transferred to Trinidad and was replaced by Mr. St. G. C. Cooper.

Leave. The Assistant Conservator returned from overseas leave in March, 1951.

Acknowledgement. The Caribbean Forester is gratefully acknowledged as is the Trinidad Forest Department's annual report.

The hard work put in both by the Field and Office Staff during the year is gratefully acknowledged.

Note: W.I. $ = 4s. 2d.

J. A. N. BURRA,
Assistant Conservator of Forests.

PART IV

REPORT ON GOVERNMENT OWNED ESTATES GOODWILL ESTATE

Policy:— Work performed on Goodwill Estate was confined to the maintenance of existing Lime and Cacao Cultivations.

No encouragement was given tenants to continue extensive or intensive cultivation of Canes as prospects for processing same were not favourable owing to a defective boiler.

Weather Conditions:— Rainfall was fairly well distributed over the earlier part of the year but following a minor hurricane on September 2nd a period of drought set in from November to December.

Pests and Diseases:—Peasants' cattle and sheep still continued to cause damage to cultivations particularly to bananas.

Leaf Spot:— As expected traces of Leaf Spot on bananas were much in evidence.

No spraying operations were carried out as it was not deemed expedient to further banana plantings as it was expected the land would be required for the purpose of a stockfarm.

Pottersville Land Rents:— The lots at Pottersville were rented to occupiers at the same rates as formerly.

Difficulty was still experienced in the collection of these rents at or before the expiration of the allcted time.

Amount Collected	—	$1,798.15
Arrears of Rents	—	

Lime Cultivation:—

Routine: The necessary weeding and cultlassing of fields were carried out and clearing of drains, water courses etc.

A considerable number of heavy bearing trees were uprocted and the area utilised for Citrus Nursery by the Agricultural Department.

A further portion of land containing lime trees was turned over to the Central Housing Authorities for Town Extension.

No fertilizers were purchased or applied but all available pen manure, mulch, decayed banana leaves and megass were applied.

Total Number of Brls. collected	—	738 11/16
Receipts	—	$ 3,336.00

Cane Cultivation:— Cane cultivation was practically at a stand still due to lack of facilities for manufacturing rum. The mill was unable to be put in operation before early July.

Due to utilizing water power to crush canes, operations were considerably slowed down and in consequence many tenants' canes were sent to Check Hall and Canefield Estates for processing on ⅓ share basis:

Total Gallons of rum manufactured were as follows:—

Check Hall	—	1,638	
Canefield	—	3,269	
Goodwill	—	4,062	— 8,969

Machinery:— Repairs had to be effected to the Water Mill before it could be put in operation for crushing canes.

A small boiler, leased from J. R. H. Bridgewater & Co., was used for operating the Rum Still.

Severe inconvenience has been experienced since the erection of a chlorinating Tank by the Colonial Development Corporation as the volume of water in the Canal proved inadequate to meet the demands of the Corporation and Caribbee Products, a canning firm, and to still leave sufficient to operate the water mill satisfactorily.

Buildings: Minor repairs were effected on estate buildings. The roof of main buildings was painted with anti-corrosive paint and walls etc. white-washed and kept in good condition.

Fodder Plots:— The area under fodder was selected by the Central Housing Authority for Town extension and in consequence fresh areas

had to be opened up and grass planted. The grass although recently planted has made satisfactory growth.

Goodwill Canal:— Throughout the year the flow of water was fairly constant except on two occasions when large portions of the overhanging cliff broke away carrying with them sections of the concrete structure.

The debris was however cleared and the wall reconstructed in a relatively short space of time.

Storage of Rum:— Cellars rented in Roseau for storage of rum were given up, there being no further need for keeping same.

Fish Pond:— A small pond which had, the previous year, been constructed and stocked with Tilapia Mosambica was kept in good condition and manure was occasionally added.

Several interested parties were given specimens to stock their own private ponds. It is unfortunate that location of the pond is not quite suitable as much water is lost through seepage.

Livestock:— The three working oxen were maintained in good condition and continued to perform the haulage duties necessary. Two grade stud bulls (Holstein) were up on service.

Large Black and Berkshire Boars were also up on service. Several interested parties made use of them.

Unfortunately the Large Black Sow aborted early in the year and no progeny was obtained.

The Berkshire sow littered six but of these four were still born. The surviving two (boars) were sold.

AGRICULTURAL SUPERINTENDENT.

GOODWILL ESTATE Trading and Profit and Loss Account as at 31st December, 1951

RUM PRODUCTION TRADING ACCOUNT

To opening Stock of Rum	$18,384.45	By cash sales	$49,762.31
„ Purchase of Materials	9,440.10	„ Credit sales	1,635.02
„ Wages	139.84	„ Closing stock of Rum (valued at cost of production)	4,865.43
„ Other working expenses	5,997.84		
„ Gross Profit c/d to Profit and Loss A/c	22,300.53		
	$56,262.76		$56,262.76

Stock on hand 31/12/51 = 3,069 Gallons. Average cost of production for year $1.57 per gallon. Opening stock 17,509 gallons @ $1.05 cost of production for year 1950.

General Produce Trading Account

To opening Stock	$ —	By cash sales	$ 5,869.19
„ Purchase of Materials	931.17	„ Credit sales	124.07
„ Wages	2,753.93	„ Gross Loss c/d to Profit and Loss A/c	3,132.30
„ Other working expenses	5,440.46		
	$ 9,125.56		$ 9,125.56

Profit and Loss Account

To Bad Debts written off	$ —	By Gross Profit B/d from Rum P.T. a/c	$22,300.53
„ General Administration	4,854.48	„ Miscellaneous Receipts (P/Ville L. Rent)	1,798.15
„ Depreciation @ 2½% for machy. & Buildings	1,716.59		
„ Gross Loss B/d from Produce Trading A/c	3,132.30		
„ Net Profit C/d to Balance Sheet	14,395.31		
	$24,098.68		$24,098.68

GOODWILL ESTATE

BALANCE SHEET as at 31st December, 1951

LIABILITIES			ASSETS		
Net Capital Assistance from Govt. Local Loan raised by Govt. in 1946		$81,600.00	Land plus additions Goodwill		$31,169.55
Loan Intd. @ 3% paid by Govt. as from 1946 to date		$13,464.00	Land plus additions Goodwill		$62,764.16
Sinking Fund Contributions made by Govt.		$11,208.00	Building and Machy.	$68,663.61	
C. D & W. Grant (D. 631) received 1946		$45,171.56	Less Depreciation @ 2½%	1,716.59	$66,947.02
Govt. Cash Grants to date	$72,990.46		Packages (Valued 31. 12. 51)		4,000.00
Plus Legal Fees etc.	$ 1,650.76		Livestock ,, ,,		312.00
	$74,641.22		Rum Stock (on cost of production basis)		4,865.43
Surplus 1951 — Less	$22,722.99	$51,918.23	Sundry Debtors — P/Ville L Rent	1,807.36	
		$203,361.79	Produce	4,458.61	
Less Assets taken over by Govt. to date		1,910.14	Cattle Pastg.	579.60	6,845.57
Profit in 1951 transactions		14,395.31	Sinking Fund 1946 Loan valued as at 31.12.51		10,614.95
			Cash		22,722.99
			Loss on Packages (not written off)	3,229.93	
			Other	2,375.36	5,605.29
		$215,846.96			$215,846.96

APPENDIX I.

DOMINICA

AGRICULTURAL EXPORTS AND VALUES (DOLLARS)

1951

CLASS I FOOD & DRINK

Cocoa Raw	—	271,894	lbs.	$	161,688.55
Coffee Raw	—	12,458	lbs.	$	7,608.68
Farine	—	4,363	lbs.	$	649.44
Avocado Pears	—	6,724	lbs.	$	19,106.55
Bananas	—	516,517	Stems	$	720,527.68
Coconuts	—	211,539	No.	$	7,615.40
Copra	—	1,461,733	lbs.	$	164,625.98
Grapefruits	—	21,509	C/Crates	$	70,427.70
Lemons	—	1,405	do.	$	5,378.24
Limes Green	—	775	Brls.	$	10,911.67
Mangoes	—	7,127	C/Crts.	$	30,122.02
Oranges	—	11,849	C/Crts.	$	52,635.05
Tangarines & Mangarines	—	565	C/Crts.	$	2,521.19
Plantains	—	81	Bunches	$	168.60
Candied & Crystalised Citrus Peel	—	16,957	lbs.	$	4,382.92
Canned Bananas	—	567,821	lbs.	$	195,055.92
Canned Mango in Syrup	—	3,184	lbs.	$	500.22
Grapefruit Segments: Canned	—	133,478	lbs.	$	24,974.84
Jams, Jellies & Marmalades	—	158	lbs.	$	40.30
Other Canned Fruits	—	29,295	lbs.	$	6,689.38
Tamarinds in Syrup	—	81,482	lbs.	$	6,811.20
Pickled Limes	—	28	Brls.	$	375.10
Pomace of Dried Lime Skin	—	37,538	lbs.	$	402.81
Preserved Citrus Skins	—	4,187	lbs.	$	859.02
Citrus Cocktail	—	2,211	Gals.	$	2,373.13
Grapefruit Juice	—	9,517	Gals.	$	18,627.58
Lime Juice Cordial	—	296,731	Gals.	$	182,877.72
Orange Juice	—	3,580	Gals.	$	5,225.12
Raw Lime Juice	—	421,645	Gals.	$	336,949.87
Honey	—	13,460	Gals.	$	2,021.70
Cocoanut Oil	—	5,618	Gals.	$	9,545.93
Ground Provisions	—		Val.	$	150.63
Carried forward					$2,051,850.14

APPENDIX I. AGRICULTURAL EXPORTS AND VALUES ($) 1951

CLASS I FOOD & DRINK

Brought forward ..					$2,051,850.14
Vegetables Others	—	35,440	lbs.	$	3,940.22
Spices Cinnamon	—	1,961	lbs.	$	407.78
Ginger	—		Val.	$	146.91
Nutmegs	—	584	lbs.	$	131.12
Vanilla	—	19,085	lbs.	$	81,239.04
Bay Rum	—	80	Gals.	$	196.89
Rum	—	6,745	Gals.	$	18,586.69
Syrup & Molasses	—	50	Gals.	$	97.20
Bay Oil	—	43,003	lbs.	$	118,790.93
Citronella Oil	—	2,870	lbs.	$	6,637.80
Grapefruit Oil	—	677	lbs.	$	3,445.42
Distilled Lime Oil	—	20,899	lbs.	$	242,065.23
Ecuelled Lime Oil	—	1,358	lbs.	$	9,777.60
Sweet Orange Oil	—	207	lbs.	$	1,080.11
Bitter Orange Oil	—	1,095	lbs.	$	4,654.50
Coconut Meal	—	200	lbs.	$	4.00
Mauby Bark	—	166	lbs.	$	12.18
Plants, Seeds and Bulbs	—		Val.	$	7,719.34
Fire Wood	—	465	Cords	$	2,790.00
Timber and Hewn	—	719	Feet	$	172.56
Timber–sawn	—	792	Feet	$	200.86
Timber Other kinds	—	4,391	Feet	$	1,000.45
					$2,554,946.97

TOTAL VALUE OF AGRICULTURAL EXPORTS $2,554,946.97

TOTAL VALUE OF COLONY EXPORTS $2,728,932.00

APPENDIX II

DOMINICA, B.W.I.
FOOD IMPORTS AND VALUES (DOLLARS) 1951

Section O — Food:				
Bovine Cattle	—	8		$ 1,405
Sheep and Lambs	—	20		$ 92
Swine	—	7		$ 52
Poultry	—	20		$ 65
Other	—	14		$ 49
Meat: Fresh, chilled or frozen of cattle	—	17,197	lbs.	$ 7,659
Meat of sheep or Lambs ..	—	12,081	lbs.	$ 4,210
Meat of Swine	—	4,008	lbs.	$ 1,397
Poultry killed or dressed ..	—	3,775	lbs.	$ 2,222
Other	—	4,596	lbs.	$ 1,660
Meat: Dried, salted or smoked (not canned) (bacon, ham and salted pork)	—	166,407	lbs.	$ 52,725
Smoked, dried or salted beef and veal	—	11,648	lbs.	$ 4,686
Meat, canned and Meat preparations, canned and not canned (Sausages and all kinds not in airtight containers)	—	10,775		$ 9,271
Meat and meat preparations in airtight containers ..	—	63,654		$ 45,154
Other	—	135	lbs.	$ 103
Meat Extracts and Preparations of Meat	—	300	lbs.	$ 723
Dairy Products, Eggs and Honey	—	132,117	lbs.	$ 41,351
Milk and Cream, dry (in solid form such as blocks, powder) ..	—	40,601	lbs.	$ 26,891
Butter, fresh whether salted or not including melted	—	21,531	lbs.	$ 19,054
Cheese	—	42,973	lbs.	$ 26,008
Eggs in the Shell	—	4,472	Doz.	$ 5,595
Fish, salted, dried or smoked but not further prepared ..	—			
Codfish	—	577,472	lbs.	$ 116,527
Herrings Pickled	—	85,878	lbs.	$ 13,313
Herrings Smoked	—	74,233	lbs.	$ 13,589
Mackerel	—	14,800	lbs.	$ 2,992
Salmon & Trout	—	1,842	lbs.	$ 601
Fish and Fish Products Crustacea and Molluses in airtight containers	—	23,779	lbs.	$ 14,952
Cereals and Cereal Preparations Rice	—	981,462	lbs.	$ 75,867
Barley, unmilled	—	2,758	lbs.	$ 401
Maize (corn)	—	395	lbs.	$ 30
Oats, unmilled	—	36,840	lbs.	$ 2,994

APPENDIX II. FOOD IMPORTS AND VALUES (DOLLARS) 1951

Section O — Food (contd.)					
Wheat Flour	—	54,518	bags	$	471,436
Meal and Flour of Maize ..	—	155,183	lbs.	$	5,652
Meal and Flour of other Cereals	—	200	lbs.	$	7
Groats, Semolina and cereals: Flaked, pearled or prepared in a manner not elsewhere specified (prepared Breakfast foods).	—	11,610	lbs.	$	3,799
Macaroni, Spaghetti, noodles, Vermicelli & similar preparations	—	21,716	lbs.	$	5,440
Bakery products (Biscuits, cake etc.)	—	51,873	lbs.	$	23,934
Cereal Preparations for food n. e. s.	—	10,072	lbs.	$	8,918
Fruits and Vegetables ..	—	285	Bunches	$	250
Other fresh fruits	—		Val.	$	41
Edible nuts (including coconuts) other than nuts chiefly used for the extraction of Oil ..	—	1,149	lbs.	$	883
Dried Fruits not including artifically dehydrated ..	—	7,006	lbs.	$	3,100
Preserved fruits, whole or in pieces, with or without added sugar, whether in airtight containers or not	—	5,175	lbs.	$	2,112
Fruit, fruit peel, parts of plants, drained, glaced or crystalized, flavoured or not	—	220	lbs.	$	130
Jams, marmalades, fruit Jellies, fruit pulps and pastes, whether in air-tight containers or not ..	—	932	lbs.	$	591
Fruit Juices, unfermented, whether frozen or not	—	52,366	lbs.	$	30,903
Fresh and Dry vegetables, roots and tubes, not including artificially dehydrated. Potatoes not including sweet	—	134,337		$	9,013
Beans, peas, lentils and other legumes (pulses) dry, including split	—	81,068	lbs.	$	16,276
Crude vegetables products used chiefly as materials for human food	—	11,446	lbs.	$	1,996
Vegetables chiefly for human food n. e. s. (including sweet potatoes)	—	138,525	lbs.	$	17,711
Vegetables preserved or prepared, (except dehydrated) in airtight containers (including all soups and vegetable juices). ..	—	8,645		$	2,904
Beet and Cane Sugar, not refined	—	5,648,082	lbs.	$	458,906
Beet and Cane Sugar refined	—	200	lbs.	$	49
Syrup and Molasses, edible ..	—	322	Gals.	$	319
Other Sugars and Syrups n.e.s.	—	1,731		$	779
Sugar, confectionery and other sugar preparations ..	—	50,257	lbs.	$	23,996

APPENDIX II. FOOD IMPORTS AND VALUES (DOLLARS) 1951

Section O — Food (Con'td.)					
Coffee extracts, coffee essences and similar preparations containing coffee ..	—	805	lbs.	$	1,994
Cocoa Powder	—	12,647	lbs.	$	8,574
Chocolate, and articles made of chocolate except cocoa powder, butter and paste (including chocolate confectionery) ..	—	5,577		$	5,489
Tea	—	4,069		$	4,949
Pepper .. — ..	—	3,134	lbs.	$	2,782
Other Spices	—	1,569	lbs.	$	1,071
Hay & Fodder, green and dry	—	434	lbs.	$	179
Bran, pollard, shraps and other bye-products from the preparation of cereal and cereal products	—	95,300	lbs.	$	9,630
Oilseed Cake and meal and other vegetable oil residues ..	—	155,380	lbs.	$	3,954
Meat meal (including tankage) and fish meal	—	600		$	76
Food wastes n.e.s. and prepared animal food, n.e.s. ..	—	12,380	lbs.	$	1,486
Margarine	—	81,767	lbs.	$	30,842
Shortenings, lard or lard substitutes and similar edible fats	—	31,888		$	12,141
Yeast	—	5,730		$	5,732
Food preparations, n.e.s. ..	—		Val.	$	13,885
TOTAL VALUE OF IMPORTED FOODSTUFFS					$1,683,567
TOTAL VALUE OF COLONY IMPORTS					$5,224,065

Food Imports = 32.23% of Total Imports

APPENDIX III

TABLE I — ANNUAL RAINFALL RETURNS DOMINICA 1951

Station	Total 1951, inches
Leeward Stations	
Botanic Gardens	68.07
Bath Estate	85.59
Canefield	94.63
Colihaut	67.77
Clark Hall Estate	119.07
Experimental Station	100.95
Picard Estate	106.19
Portsmouth Agricultural Station	126.86
Soufriere Estate	98.74
Inland Stations	
Cocoa Station	93.01
Sylvania	189.40
Shawford	167.96
Windward Stations.	
Delices	149.21
Grand Bay Agricultural Station	122.04
La Plaine Agricultural Station	151.90
Londonderry Agricultural Station	118.38
Pte. Mulâte	127.15
Stowe	131.27

Mean Rainfall for 18 Stations 118.62 Inches
„ „ „ 9 Leeward Stations 95.09 „
„ „ „ 3 Inland „ 150.12 „
.. .. „ 6 Windward „ 133.33 „

APPENDIX III. ANNUAL RAINFALL RETURNS DOMINICA 1951

TABLE II — MEAN MONTHLY RAINFALL, BOTANIC GARDENS

Month	1951, inches	25–Year Mean inches
January	5.96	5.45
February	2.92	3.13
March	1.88	2.95
April	3.84	2.68
May	13.20	3.65
June	10.54	8.03
July	8.32	10.88
August	10.36	9.78
September	9.69	8.66
October	4.80	7.55
November	7.82	5.53
December	6.74	10.74
TOTAL	86.07	79.03

APPENDIX IV
METEOROLOGICAL SUMMARY BOTANIC GARDENS, DOMINICA, 1951

YEAR 1951	PRESSURE Corrected & Reduced to 32° F., M.S.L.				TEMPERATURE								Relative Humidity		Rainfall
	Highest	Lowest	Means		Absolute		Mean Values						Means		Amount
					Max.	Min.	Max.	Min.	Dry Bulb		Wet Bulb				
	IN	IN	9 a.m.	3 p.m.	—	—	—	—	9 a.m.	3 p.m	9 a.m.	3 p.m.	9 a.m.	3 p.m	—
	IN	IN	IN	IN	°F	°F	°F	°F	°F	°F	°F	°F	%	%	IN
January	30.06	29.83	29.97	29.89	85	62	82	68	76	80	71	73	75	69	5.96
February	30.05	29.84	29.97	29.72	85	65	83	69	78	81	72	74	73	70	2.92
March	30.88	29.85	29.99	29.89	86	65	84	69	78	83	71	73	67	59	1.88
April	30.04	29.81	29.98	29.88	87	70	86	73	82	85	75	76	69	64	3.84
May	30.03	29.83	29.96	29.88	89	71	86	74	81	84	77	78	74	74	13.20
June	30.02	29.80	29.91	29.87	90	75	82	77	82	90	76	77	74	64	10.54
July	30.03	29.84	29.33	29.03	90	71	83	74	82	86	78	79	79	69	8.32
August	30.05	29.77	29.94	29.88	90	78	89	74	83	87	78	80	76	68	10.36
September ..	30.00	29.83	29.93	29.87	91	72	89	73	82	87	76	80	79	70	9.69
October	30.02	29.83	29.93	29.43	90	71	88	73	82	85	77	79	78	71	4.80
November ..	30.00	29.83	29.93	29.86	89	70	87	72	81	86	77	78	79	65	7.82
December	30.05	29.82	29.98	29.32	89	70	85	72	79	83	75	76	78	66	6.74
Year Average ..	30.10	29.99	29.90	29.71	89	70	86	72	78	85	75	77	75	67	7.17

Highest Barometer Reading .. 30.88 ins. on 10th March.
Lowest „ „ .. 29.77 ins. on 15th August.
Highest Maximum Temperature .. 91°F on 10th, 11th September
Lowest Minimum Temperature .. 62°F on 23rd January.
Greatest Rainfall in 24 hours .. 4.10 ins. on 10th May.

APPENDIX V

REPORT ON A VISIT TO DOMINICA, B.W.I.

7th — 22nd November, 1951.

By F. J. SIMMONDS,
Commonwealth Institute of Biological Control

This visit was intended as a survey of the possibilities of biological control of the insect pests occurring in Dominica, and an opportunity was also taken to release numbers of **Plaesius javanus Er.** and **Leionota quadridentata** Oliv., predators of the banana borer, **Cosmopolites sordidus** Germ. The insect pests will be dealt with according to the crop attacked.

2. LIMES

The insect pests attacking limes and other cirtrus crops have been studied extensively by R. G. Fennah (Citrus Pest Investigation in the Windward and Leeward Islands 1937–42) and it is pointless recapitulating his work.

a) **Citrus weevil, Diaprepes abbreviatus L.**

There are in Dominica two additional species of this genus with immature stages and habits apparently identical to those of **D. abbreviatus,** namely — **D. famelicus Gyll.** and **D. Balloui** Mshill., the latter apparently only in upland areas (Fennah 1942). Only two adults were seen during this visit and they were both **D. abbreviatus.**

When on citrus the eggs are laid usually at night between two leaves which are stuck together by adhesive material produced at the time of oviposition. They are laid in a cluster of from 10–250 usually between 60–90 (Fennah).

On hatching the larva wriggles out from between the leaves and falls to the ground, into which they burrow. They may begin feeding on vegetable debris before attacking living roots, on which they feed for some 6 months or more prior to pupation. The larvæ may damage small roots and also make channels about ¼" wide along larger roots or girdle them near the trunk. In young trees this may result in death, but with older trees it is difficult to estimate the actual damage caused in this way.

When full-grown the larva burrows down to a depth of from 1½ to 2 feet, forms a "cell" and pupates. After 2—3 weeks the adult emerges but remains in its "cell" until the beginning of the rainy season when all the adults emerge over a short period following the first few heavy showers. The adults are far more active at night, when feeding and egg–laying occur.

The amount of feeding by adults on limes and other citrus in Dominica as seen by old damage to leaves at this time has not caused any serious damage this year.

However in the Government citrus nurseries at various agricultural stations the damage to young plants has been very serious this year and numbers of dying plants were examined; death in nearly every case could be attributed to damage by **Diaprepes** larvæ.

At Goodwill it was estimated that of the 28,000 plants set out only 9,000 would survive. The cost per plant was increased from about 15 cents to 75 cents (allowing for "supplying") and apart from this the demand for lime trees could not be met. It was stated that damage was heaviest when wild grapefruit was used as stock, less with sour orange and less again with seville orange.

APPENDIX V.— REPORT ON A VISIT TO DOMINICA, B.W.I.

One notable exception was found where a lime nursery had suffered no damage from **Diaprepes**; this was at Melville Hall, the Colonial Development Corporation's property, where a nursery had been laid down on land very soon after the felling of secondary forest. It might be possible by the choice of such sites to avoid damage to lime nurseries in this way.

At Goodwill where the lime nurseries are in the same area this year at last and damage has been very severe an experiment was carried out to see if one of the newer insecticides would be of economic value in controlling **Diaprepes**. It is claimed that the chlorinated hydrocarbon aldrin (1, 2, 3, 4, 10, 10 — hexachloro — 1, 4, 4a, 5, 8, 8a — hexahydro — 1, 4, 5, 8 — diendo — methanonaphthalene) can retain its insecticidal properties in the soil in temperate climates for over two years. This may be very much modified under tropical conditions of rainfall and temperature, but still might have a long enough residual effect to be of economic use against certain soil infesting species. Nurseries beds were being planted out at this time and six were used in the experiment, three were left as controls and three treated with an emulsifiable aldrin preparation, at the rate of about 4 lbs aldrin per acre. This was put on in two applications on the bare soil, after each the bed was immediately turned over with a fork to ensure that the insecticide was mixed well into the upper layer of soil. Stock cuttings were planted soon afterwards.

Results should be apparent within the next six months.

Even if this experiment is unsuccessful it should be possible to keep lime nurseries free from **Diaprepes** damage by means of a few simple precautions. At the time of emergence of adult beetles the leaves of the plants in the nurseries should be sprayed with lead arsenate suspension. This will kill the feeding adults and prevent oviposition. Any egg masses that are laid can be collected by hand. General attention to the speedy cleaning up of old nurseries once they are no longer of use would also help.

Throughout the island damage of varying degrees of severity to the roots of both young and old citrus trees was seen. It is difficult to assess the exact damage caused to the tree by this feeding on the roots. When a large root is "girdled" the damage is obvious, but when young roots are attacked further small roots are quickly formed to replace them. A tree may appear quite healthy even though the roots are being damaged each year by weevil larvæ. There are so many other factors involved in the general health of the tree — soil conditions of drainage, nutrients, etc. type of stock on which the limes have been budded, partial incompatibility, etc. that assssment of the damage caused by a light but steady attack by **Diaprepes** larvæ is impossible. However, it would seem worthwhile to treat the soil of an experimental area of trees with an insecticide with long residual effect (and one which has been shown to be toxic to **Diaprepes** larvæ) to determine if increased production or vigour of the trees results. The soil under the trees should be bared, the insecticide applied at a suitable rate and the soil turned over with a fork in order to incorporate the insecticide with it.

With regard to the biological control of this pest a certain amount has already been done in Puerto Rico, Barbados and St. Lucia but all the possibilities have not been fully explored. Several species of egg parasites are known, and one species, **Tetrastichus manylandensis** Gir. from Dominica was liberated in St. Lucia under favourable conditions, but did not appear to become established. Apart from the season when egg masses are abundant there are few to be found in the field. Hence with a very fast build up at the beginning of the rainy season in the abundance of eggs there are few parasites about and it takes some time for parasitism to increase to high level. A wet "dry season" favours early heavy parasitism since there are more eggs laid "out of season" and

the parasite population is able to maintain itself at a higher level. The exact host-relationships and life histories of the parasites have also to be worked out. Any work that is carried out on this might also be correlated with similar work on **Diaprepes** attacking cane (**D. famelicus** in the Leewards).

Larval or pupal parasites are unknown. At the same time as **Diaprepes** Larvae were found feeding on roots, larvae of the "hard-back",? **Ligyrus** sp. were also seen.

b) . . Fruit-piercing moths.

A large proportion of ripe grapefruit and oranges was found to be ruined by punctures made by the probosces of fruit-piercing moths and also by the attacks of "sucrier" birds, Coereba sp. It has been suggested that the "sucriers attack only fruit bearing punctures made by the moth, but there seems no evidence for this, and it would appear that the two types of attack are entirely independent.

Several species of moth feed on ripe fruit by puncturing the skin with the probosces and then sucking juice from the interior of the fruit. **Gonodonta incurva** Sepp. is the most common species involved in Dominica. After the puncture is made fungal rot sets in, and the fruit soon bears a discoloured circle about an inch in diameter around the original hole. Each fruit punctured is therefore valueless. Fruit that is picked immediately after puncturing may appear sound, but if packed before the rotting has become apparent may cause serious loss to surrounding fruit in a case.

Only ripe fruit is attacked, and at Silvania Estate in an upland area damage may occur from November to February, particularly heavily in December. Any ripe fruit may be attacked, but Lamb Summer orange seems to be avoided slightly. The later part of the Naval crop is heavily attacked, followed by the Valencias, late Valencias and even Lamb Summers too may be attacked heavily if they ripen early. In February the attack may be so heavy that fruit **must** be picked immediately it is ripe. Fruit ripening in July and August does not appear to be attacked, and it is uncertain what occurs with regard to the life history of **Gonodonta** at this season.

The larvae of **Gonodonta** apparently feed on plants of the families Annonacae and Piperaceae but little is known of their life history.

Further investigation of this pest will be necessary before effective control measures can be taken.

c) Sucriers.

At the time of this visit these birds were very plentiful, and were causing considerable damage to ripe and nearly ripe fruit. Holes are packed in the fruit in order to obtain juice, and tangerines were seen that were being almost entirely eaten out, only the skin remaining. Attacked fruit rot quickly and are quite useless.

Fennah (1942) developed a method of killing these by injecting a 5% solution of strychnine into ripe fruit cut in halves. These were lodged in the tree and birds came to them readily and were killed. Slight modifications of this method have been used — a small slice has been cut off the fruit, and after injection it has been put, not in the main fork, but higher in the tree where the birds are usually feeding. There has been a certain amount of opposition to killing off the birds in this way, and the method has been discontinued. However, in view of the severity of damage caused — at Ridgefield it was estimated that at least 20% of the present crop was being rendered useless — it does seem that a widespread campaign against these

birds would be justified, provided, of course, that a market can be found for fruit thus saved.

Sucriers are also apparently used for food and a number are caught by boys for this purpose. It might be worthwhile encouraging this by paying a price per capita for all sucriers destroyed on the estate.

d) Orange moth, Gymnandrosoma sp.

In the higher parts of the island some damage has been caused by this species. Eggs are laid on the skin of young fruit and the larva on hatching bores into the pulp and seeds. It seems apparent that the oranges are only an incidental host and that most of the eggs are laid on the fruit of bois blanc, **Semiruba amara**, which is a common forest tree, and is the wild host of the moth. Control may be obtained where necessary, by cutting out all bois blanc growing within 100 yds. of the affected citrus.

e) Scale insects

A number of scale insects were seen on citrus including the green scale, **Coccus viridis** Green, the purple scale, **Lepidosaphes beckii** Newst., **Chionaspis Citri** Comst., **Pinnaspis** sq., **Chrysomphalus** sp., and ? **Ischnaspis longirostris** Sign. However, only on one or two dying trees at Goodwill were these at all plentiful, and several species of Coccinellids, including **Chilocorus cati** L., ? **Azya orbigera** Mshl., **Exochomus nitidulus** L., were found feeding on them. Many of the scales had also been killed by fungus, and in Dominica no measures are apparently generally necessary against them as they are only found on trees which are unhealthy from other causes.

f) Snail damage

A number of species of snail was seen on citrus. No serious damage was seen though one of them, **Amphibulima patula** (Brug.) has been found causing damage at Copt Hall (Fennah 1942).

g) "Mistletoe", Loranthus sp.

In some areas **Loranthus** sp. has become a serious pest on limes particularly where cultivation has been neglected for a time. Cutting out of the parasite has been successful in places, but to be effective this has to be done most carefully.

3. BANANAS

The banana borer, **Cosmopolites sordidus** Germ., is the only serious insect pest of bananas in Dominica. It was found commonly over the whole island and was locally quite serious, apparently reducing yields and weakening stools so that stems were easily blown over in a strong wind. As elsewhere it has been found that it is practically impossible to grow plantains on account of their susceptibility to borer damage.

During examination of stools a native predator of the banana borer was found, **Dactylosternum** sp. (Hydrophilidae).

There are a number of neglected banana cultivations, but in general care seems to be taken to dispose adequately of old stools and cut pseudostems where Cosmopolites may breed rapidly. The stems are either removed to form compost or are cut up into small pieces in the field, in which condition they are unsuitable as breeding places for **Cosmopolites**. In some newly planted areas e.g. Melville Hall and a small area in Picard Estate, the growth of bananas on land planted almost immediately after clearing the secondary forest has been very poor. Careful examination here has shown that this is not due to **Cosmopolites**; borers were in fact very scarce in these new areas since

the beetles have as yet had little chance to build up a large population, and if careful precautions are taken it should be possible to prevent serious outbreaks. The poor condition of the bananas in these areas appears to be due to nutritional deficiencies, either directly related to soil conditions, or to the effect on the availability of certain nutrients of the slow rotting of the forest debris lying in the fields. Experiments using compost and artificial fertilizers at the time of planting were suggested.

At Woodford Hill Estate some areas had heavy borer attack, and here liberations were made of the predators **Leionota quadridentata** and **Plaesius javanus.** At one site 732 **Leionota** were liberated; at a second selected site where a number of rotting pseudostems were piled 100 **Plaesius** were released.

Also at Woodford Hill in a fairly heavily attacked area an experiment was carried out to test the insecticide aldrin against **Cosmopolites.** Between three rows of banana stools two lines of holes 10 feet apart were dug (1½' x 1½' x 1½') for planting plantains. A half basket of rotted compost was placed in each hole and then each hole in one line was sprayed with aldrin emulsion at the rate of 4 lbs. of aldrin per acre. The earth and compost in each hole were then thoroughly mixed, the plantain suckers which were to be planted in the treated holes were dipped in an aldrin emulsion (about 1 oz. aldrin per gallon of water) before planting. Thus two rows each of ten plantains were set out, only differing in that in one row the soil and sucker were treated with aldrin. In the normal way plantains succumb to borer before or soon after the first bunch has been produced, and this experiment should be a good test of the efficacy of this insecticide against banana borer.

At Concord Estate 75 **Plaesius** were liberated in a poorly kept banana area, and at Londonderry Agricultural Station 732 **Leionota** were liberated in a banana area planted as shade for experimental cocoa plots.

It should be emphasised that the most satisfactory method of reducing borer damage is by careful cultivation, planting only borer–free suckers, disposal of all pseudostems and old stools, and removal of all infested material. Predators will be most effective in those areas where there are neglected banana cultivations, and here they may be effective in preventing very large increases in population of the borer which would affect neighbouring cultivations.

Traps have been used to catch **Cosmopolites** adults, but these are not very effective unless carried out efficiently on a large scale over a wide area, and labour costs in the West Indies make this method im–practicable.

4. COCONUTS

Coconuts were free from major insect damage, coconut scale, **Aspidiotus destructor** Sig., **Pseudococcus nipae** Mask and the coconut whitefly, **Aleurodicus cocois** (Curt.) were all common but were not causing serious damage. The coconuts, especially at Clark Hall Estate in the Layou valley were very green and compared very favourably with those in other islands. Trees growing in poorly drained areas showed characteristic yellowing of the leaves, and those in exposed situations carried more scale, but in general they were very healthy.

Feeding on the scales were seen **Chilocorus cacti** L., **Azya trinitatis** Mshll., **Exochomus nitidulus** F. and an undetermined species, (? **Scymnus**). On whitefly there was a **Scymnus** sp., but no signs of parasites were seen. However, these Coccinellids were not very common, as would be expected from the low incidence of scale.

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In a very wet valley at Melville Hall search was made for the scale which attacks coconuts at Orange Hill, St. Vincent, but this was not found, though conditions are apparently ideal for it.

5. SUGAR CANE

Cane was examined in several areas. At Goodwill very little cane borer was found, though it was stated that damage had been severe. At Portsmouth Agricultural Station a little was seen in a very small plot of B 37161. At both Grand Savannah and Bagatelle attack was very severe, between 20 and 30% joint infestation in half grown cane. **D. Saccharalis** only was seen, of 120 larvae examined from Grand Savannah none was parasitized. Bearing in mind the success of the introduction of both **Lixophaga diatraeae** Tns. and **Metagonistylum minense** Tns. in the neighbouring islands of Guadeloupe arrangements have been made to liberate both these species in Dominica as well as **Paratheresia claripalpis** Wulp., and for samples to be taken later to determine if establishment has taken place.

Cane is not a particularly important crop in Dominica and no sugar is manufactured commercially ; the cane is crushed and the juice fermented and distilled to produce rum. Hence the juice purity aspect of **Diatræa** infestation is not important, the only damage sustained is the direct loss of sugar in the cane, which will present borer infestation is considerable. Mealybugs, **Trionymus sacchari** (Ckll.) were common and no predators were seen.

No corn was seen in a suitable condition for infestation by **Diatræa** but one larva was found in Sudan grass. **(Sorghum vulgare)**.

6. COCOA

Increasing attention is being paid to cocoa, and numbers of young trees are being planted. In connection with this there is a Government Cocoa Propagator at Hillsborough. Some thrip **(Solenothrips rubrocinctus** Giard.) damage had been seen there on young cuttings, due undoubtedly to insufficient humidity. Thrips were seen at a number of places, and were causing serious damage to young trees at Clark Hall and Picard, particularly at the latter estate where several young trees are dying, apparently owing to severe defoliation caused by heavy thrip attack. Increased shading and protection from wind should be provided to eliminate this damage.

Damage to young flush by leaf-eating larvæ was also seen but the insects involved were not observed.

Some **Pseudococcus** sp. were also seen, but incidence was very low.

7. SWEET POTATOES

At Grand Savannah, a dry area, sweet potatoes are being grown on a large scale and have suffered considerable damage from the scarbee weevil, Euscepes batatæ Wat. About 50% of the crop is thrown away on account of weevil damage and tubers examined were heavily infested with larvæ and adults in the pupal chamber, one tuber weighing about a pound had 109 weevils in all stages in it.

Choosing weevil free planting material helps to reduce infestation and control may be effected by periodic spraying with lead arsenate or a suitable preparation of DDT, BHC, etc.

An experiment was laid out here for the treatment with aldrin on the soil of 10 rows in a field to be planted. If aldrin is as effective as claimed against soil infesting forms this method of control should keep the growing tubers completely free from attack, using only one application of insecticide.

Sweet potatoes were seen elsewhere, some attack was noted, but in the wetter parts of the island, as would be expected, little damage was seen.

APPENDIX V.— REPORT ON A VISIT TO DOMINICA, B.W.I.

With the present food shortage in Roseau every effort should be made to increase the production of sound sweet potatoes.

8. COFFEE

Coffee has in the past been inportant in Dominica and with present price levels there is a reviving interest in this crop. However, it is almost impossible to grow **C. arabica** because of the heavy attacks by the coffee leaf miner, **Leucoptera coffeella** Guer. The attack is less on **C. robusta** and **C. liberica** is almost immune. However the demand for "arabica" is far greater than for the others, and some attempts are now being made to grow it. Steps should be taken to ensure that it is grown under the conditions of shade optimum for low incidence of Leucoptera. There is also the possibility of biological control of this pest. Several parasites are known from other West Indian islands and also from East Africa. These should be tried after an investigation has been made of the parasites already existing in Dominica. The life history of Leucoptera, in which all stages are exposed to possible parasitism, makes it most susceptible to parasite attack.

MISCELLANEOUS

A number of further observations were made on crops of minor importance.

Some pawpaws carried a very heavy attack of **Pseudaulacaspis** pentagona Targ., no Coccinellids were seen on this, and lizards, **Anolis** sp., were common on the trees. No pawpaw mosaic was seen.

On bamboo **Asterolecanium bambusæ** Boisd. was common and Chilocorus cacti was predaceous on it. On an exposed avacardo tree at Grand Bay **Coccus viridis** was common and feeding on this were **Exochomus nitidulus** and **Azaya ? orbigera** E. **nitidulus** was also seen feeding on green scale on **Allamanda. C. cacti** was seen on **Lepidosaphes beckii** on lime, and **Azya ? orbigera** on **Chrysomphalus** on the same host tree.

On corn **Zelus rubidus** Lep. (Reduviidæ) was seen feeding on an adult **Euxesta stigmatias** Lœw.

On tomatoes **Pothia picta** (Drury) was causing damage to fruit at Ridgefield, where also gladioli were being severely attacked by thrips, the immature stages and adults of which were found in unopened buds. Deformed and discoloured blossoms resulted. These gladioli were from imported corms and it is possible that this thrips is also imported species.

On pigeon pea at Government Office **Saissetia hemispherica** (Targ.) was common, tended by ants. On the same plants were **Orthezia insignis** Doug. and aphids ; feeding on the latter was a Coccinellid (? **Scymnus** sp.)

Cabbages, though only few were seen, were seriously attacked by **Plutella maculipennis Curt.** No **Pieris monuste** (L.) was seen.

Vanilla was examined at Melville Hall, but no insect damage was observed.

Calpodes ethlius Cram., the arrowroot leaf-roller, widespread, and the situation is interesting. In many areas particularly on the parts of the Windward coast visited arrowroot grows wild in hedges etc. and **Canna edulis** (tous-les-mois — used as a vegetable) is also common. Although eggs were commonly found larvæ and larval damage were not, and damage to the wild arrowroot, in all stages of growth, was negligible. Trichogramma sp. parasitised a very large proportion of the eggs and some of the larvæ seen were parasitised by **Elachertus merdionalis** Cwfd. Thus here apparently is an example of the admixture of **Canna** and arrowroot resulting in protection of the latter from damage by Calpodes and is further justification for planting **Cannas** experimentally on a large scale around arrowroot fields in St. Vincent.

Several weed pests were also noted, love vine, **Cuscuta americana** is considered a pest, and the imported lemon grass, **Cymbopogon citratum,** has now increased in certain areas so as to become a very serious pest which it is difficult to control.

GENERAL

The most promising immediate possibilities for biological control in Dominica are the introduction of predators against the banana borer, Cosmopolites sordidus, and of parasites of the sugar cane moth borers, **Diatræa saccharalis.** Although Dominica is in general extremely wet (the range of annual rainfall in 1948 over 22 stations was from 68.3 inches at Colihaut to 250.4 at Riversdale), the cane area on the Grand Savannah is comparatively dry and it seems probable that the environment might be suitable for **Lixophaga diatræa** a Tachinid parasite of **Diatræa.** Elsewhere, at Bagatelle, **Paratheresia claripalpis** and **Metagonistylum minense** might become established.

These introductions have been arranged and some liberations have already been made.

The further investigation of the possibilities of the biological control of Diaprepes spp. might be further considered as this is a problem of considerable importance not only for the citrus industry in Dominica, but for that in other islands, and for the cane industry in Puerto Rico, the Leewards and Barbados. Further work might be done on the known egg parasites from different areas, bearing in mind that control might be effected by obtaining higher parasitism earlier in the seasonal life history. At present with sugar cane it is probable that a satisfactory chemical control of the larvæ in the soil may be obtained with persistent insecticides, and this method may also be applicable to citrus. However, this will be expensive and does not eliminate the possibility that further advance may be obtained from biological control investigations.

Further investigation of the control of orange piercing moth (**Gonodonta incurva**) is obviously necessary if the orange and grapefruit industry in Dominica is to be expanded. Considerable loss of ripe fruit is sustained, but at present so much fruit is not picked owing to lack of marketing facilities that the importance of the loss from "pierced fruit" is not as great as if all fruit were marketable. If it is intended to increase marketing facilities then an effort should be made to reduce this pest which, with sucriers, this year caused a loss of citrus in Dominica to the value of an estimated minimum $50,000. A full investigation of the life history of the moth and its parasites would be necessary before control measures could be suggested.

The coffee leaf miner, **Leucoptera coffeella**, certainly at present will prevent any serious increase in production of **C. arabica,** the most desirable type of coffee. **C. robusta, C. Liberica** and **C. stenophylla** etc. are less attacked and may be grown, but the quality of coffee produced is lower. This is a problem in which the introduction of beneficial species, following detailed investigation in Dominica, might be of considerable importance and if expansion of coffee planting on the island is considered for the future early information as to the present status of parasites in Dominica should be obtained.

Vegetables are at present of minor importance, and **Euscepes** damage to sweet potato has been mentioned above.

Coconuts and cocoa are free from serious insect pests, as apparently are the various species producing essential oils — bay tree, **Pimenta acris,** citronella grass, Cymbopogon nardus etc.

I should like to take this opportunity of thanking the Agricultural Superintendent, Mr. St. G. Cooper, and members of the Department of Agriculture for their constant help during my visit and to the various estate owners for their interest and hospitality.